THE

Practical Teacher

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'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

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Technical Instruction in Elementary Schools.

BY SIR PHILIP MAGNUS.

V.—SCIENCE TEACHING.

ON the advantage of knowing something of the properties of the different materials by which we are surrounded, and of the laws which regulate the action of the forces which we are constantly endeavouring to control and utilize, it is unnecessary to spend many words. In nearly every action of our lives we are reminded of the services which science renders to our means of living. There can be no longer any question of the necessity of making science teaching an important element of general education. The late Professor Guthrie well said: 'Though a boy may not be intended for an occupation in which science is required, and though he show little or no aptitude for it, it is as unjust to hide science from him as it would be to hide a knowledge of history, or literature, from those who are not intended to become historians or authors.'*

The principles of instruction insisted upon throughout these articles are equally applicable to the teaching of science as of other subjects. Looked at from its disciplinary side, the object of the instruction is to cultivate in the pupil habits of accurate observation, and of close reasoning; and from the utility standpoint, to impart serviceable information and to provide definite training in the methods of investigation applicable to all kinds of inquiries.

If these be the objects of science teaching, they must be kept in view, so far as possible, even in the rudimentary stages of instruction; and we have now to enquire to what extent, and in what way, science can be taught in elementary schools, so as to effect these objects, and at the same time to serve as a preparation for higher technical instruction.

Having regard to the age of the children attending elementary schools, and to the conditions of their home life, which prevent them from gaining much information from their parents with respect to their ordinary surroundings, it is necessary that the school should seek to supply the place of home, and that the teacher should encourage and try to satisfy that spirit of enquiry which is common to all children. It is not desirable that children should commence at a very young age the study of any isolated branch of science, be it Chemistry, Botany, or Mechanics; least of all, that they should try to learn it by such methods as are laid down in any of our approved text-books. Science may become as 'bookish' as any other subject of instruction, if imperfectly taught, and may even yield less intellectual discipline than grammar. The study of science is valueless unless it stimulates accurate observation by bringing the mind constantly into direct communion with external things. The instruction must be of the kind which the Germans call '*Anschauungsunterricht*,' *i.e.*, instruction by means of direct perception, in the properties of things, and in the laws, if any, which connect these properties with one another. The spirit of enquiry common to every young child should be encouraged and directed into channels through which the pupil may obtain some insight into the laws and processes of nature, and some knowledge of the methods by which these laws may be ascertained. It is needless to say that the teacher must throw life into the lessons, that he must possess a much higher knowledge of the subject than he can hope to impart to his pupils, and that he should speak from the results of his own experience and investigations. For this reason, it is most important that the teacher of science, even in elementary schools, should have received a proper scientific training, and should be acquainted with the best methods of instruction. The teaching of elementary science to small children is no doubt more difficult than the teaching of science in its advanced stages to older pupils. As the student progresses he instructs himself, and he avails himself of the services of his teacher or professor as a guide only or referee. In the early stages of education, highly trained teachers are indispensable, and these are equally needed for the proper teaching of science as of other subjects.

As a foundation of technical education, which consists almost entirely of instruction in the application of science and art to different industries, the study of science cannot be commenced too early, and should be continued throughout the whole period of education. 'For, leaving out only some very small

* Cantor Lectures on Science Teaching. (Society of Arts, 1886.)

BRITISH MUSEUM

classes,' Mr. Herbert Spencer pertinently asks: 'what are all men employed in? They are employed in the production, preparation, and distribution of commodities. And on what does efficiency in the production, preparation, and distribution of commodities depend? It depends on the use of methods fitted to the respective natures of these commodities, it depends on an adequate acquaintance with their physical, chemical or vital properties, as the case may be, that is, it depends on science.'* In order that this science may be profitably taught, and that our elementary school teachers may know not only what to teach but how to teach it, it is necessary that they should have further opportunities than they at present possess of being trained under the best masters.

In answer to the question, what to teach? I would say: Some knowledge of the things that immediately surround us—the earth we walk on, the air we breathe, the water we drink, the food we eat, the clothes we wear, the trades we practise. These are the subjects, properly investigated, that should constitute the science lessons in elementary schools. In answer to the question, how to teach them? I would say: By Kindergarten methods, *i.e.*, by means of object-lessons systematically pursued. The pedagogic principle—to proceed from the known to the unknown—furnishes the key to the true method of science teaching.

Taking such subjects as I have indicated as texts, many of the lessons might be made as suitable to one locality as to another; whilst some would have special reference to the geography of the neighbourhood of the school, and to the occupations of the people of the district. In manufacturing towns, a talk about the simpler kinds of machinery in common use might lead up to a study of the rudimentary principles of mechanics, whilst in schools situated in rural districts lessons on agricultural practice might prepare the way for the systematic study of elementary chemistry. The teachers being competent, and possessing a wide knowledge, and some enthusiasm in the pursuit of science, the lessons ought not to be regulated by any fixed code, nor should the value of the teaching be assessed by the results of any definitely arranged system of examination. Indeed, considerable latitude should be given to teachers and to school authorities; but it is important that the teaching should be based on some fixed principles, by which it might be made the means, not only of imparting useful information about a variety of common things, but of leading, by sure and regular steps, to a knowledge of the simple facts and laws of one or more branches of science; and it would, therefore, be desirable that the methods and results of the teaching should be carefully inspected by competent judges.

Under the headings above indicated the paths are very numerous along which the springs of pure science may be approached. As the complex phenomena that present themselves to the senses are stripped of their accidental circumstances, and the laws underlying them laid bare, these laws should be demonstrated by simple experiments, which it should be the endeavour of the teacher to associate in the pupil's mind with the description of the object under consideration. It is only in this way that science teaching can be made to yield that most important of all educational exercises, the discipline of careful reasoning.

* 'Education,' by Herbert Spencer.

The late Professor Guthrie in the suggestive series of Cantor Lectures, from which I have quoted, indicates the broad lines upon which such object-lessons should be given, and illustrates them by reference to the 'stuffs' that are met with in the building of a house. After considering concrete, sandstone, coal, and other stuffs used in house building, he says: 'The method of obtaining a light leads to the interesting and instructive subject of matches, and the stuffs of which they are made. Perhaps, here, the heat produced by friction may be examined, and so a foretaste obtained of the great doctrine of the mutual relationship of the forces, the indestructibility of energy—the doctrine not second in importance to that of the elementary constitution of matter.' The temptation, however, to pass on too rapidly from the observation of the properties of things, the explanation of their uses, and the causes underlying those uses, to the great generalisations of science has to be carefully guarded against. In science culture as in house building there are many courses between the foundation and the roof.

Of object-lessons, Mr. Herbert Spencer well says: 'They should not be limited to the contents of the house, but should include those of the fields, and hedges, the quarry, and the seashore. They should not cease with early childhood, but should be so kept during youth as insensibly to emerge into the investigations of the naturalist and the man of science.' The difficulty of arranging systematic object-lessons, so as to make them the means of teaching the rudimentary principles of science, is well pointed out by Professor Bain, in his excellent work on the 'Science of Education.' 'It is possible,' he tells us, 'by means of the object to approach the primary sciences, namely, Physics, Chemistry, and the rest, with the view of explaining matter and motion, gravity, heat and light; but the manner of doing so needs the gravest consideration.' Object-lessons, leading up to the study of natural history, are undoubtedly a most valuable part of elementary education, and are generally found to be most serviceable in stimulating observation among young children; and for this reason they may well form part of the science teaching in all schools. Moreover, in rural districts, and as a preparation for agricultural education, they have a special value of their own. But I am now more directly concerned with science teaching as a part of technical instruction; and for this purpose it is necessary that the object-lessons should be directed towards the ultimate study of the elementary principles of physical science. For the ordinary student there are doubtless advantages in the studying of physical science by the regular systematic methods as laid down in science text books. But, for the young pupil, the case is different. Nevertheless, there are so many advantages in following the regular order that Mr. Bain is right in saying that 'the teacher should always be looking forward to the time when the advancing intelligence makes that possible, and further, he should tacitly keep this order in this mind even when working on the seemingly desultory plan.'

Nearly all writers on education are at one as to the value of object-lessons in teaching the first rudiments of science. The difficulty occurs in finding teachers who are capable of so arranging a series of lessons as to prepare the way for the systematic study of any one branch or science. As

regards method there is general agreement, and few would be found to dissent from Rousseau, who, in his 'Emile,' tells us: 'Dans la recherche des lois de la nature commencez toujours par les phénomènes les plus communs et les plus sensibles.'

It is easier to point out what should not, than what should constitute a good object-lesson. Of the examples of such lessons that have been published, many serve their most useful purpose in indicating what the practical teacher should avoid. We should guard against the error of making the lessons too desultory or a mere verbal explanation of terms. Certain fixed principles which should dominate the lesson ought always to be present to the teacher's mind, and perhaps the main purpose of the teacher in these lessons should be 'to guide, rectify, direct and forward' the spontaneous powers of observation and reasoning which all children exhibit. It must be remembered that the aim of science teaching in elementary schools is not to make specialists in science any more than it is the object of workshop instruction to make tradesmen. The real difficulty of the object-lesson consists in the attempt to explain all that the object suggests, and at the same time to keep in view the scientific principles which the lesson ought ultimately to bring out. The full explanation of all the phenomena which are associated with any single natural object demands a knowledge of many different branches of Science. In order to avoid exuberance of explanation, and a too desultory treatment of the matter, the teacher, who should be in full mental sympathy with his pupils, knowing clearly how much, or, rather, how little they can understand, must aim steadily at eliminating some single physical law, which afterwards he should endeavour experimentally to prove. Whilst scientific information is doubtless interesting and of considerable value to the pupil, what is educationally important is to train the child in the methods of science. Starting from the same object the teacher may arrive at a simple fact or law in Chemistry, Heat, Dynamics, or some other branch of science. From the very outset, however, he should have clearly in view the goal he desires to reach, and he must avoid the temptation to explain too much. Just as the anatomist in dissecting a limb picks out a particular muscle and demonstrates its function, so the science teacher must try to show the operation of a single law in the bundle of complex phenomena that may be presented to him; and the law having been evolved the teacher should proceed to prove it by rudimentary experimental methods. In this way, by a proper choice of subjects, a few of the leading facts of Chemistry, Physics, and Mechanics may be imparted to children by means of explanations of things with which they are familiar, and a good basis may thus be laid for more advanced and more systematic science teaching.

For science teaching, such as I have attempted to describe, some amount of apparatus is needed, but the apparatus should be of the simplest character, and the pupils themselves should, as far as possible, be employed in constructing it, utilising the skill they may be expected to have acquired in their workshop classes. It matters very little that the apparatus employed is rough and simple. The pupil will learn more of scientific method by registering the result of his own experiments with apparatus he has himself made, than by seeing any number of successful experiments performed by his teacher. On this point Rousseau may again be quoted. After expressing his dissatisfaction with the ordinary methods of teaching science, he says: 'L'air scientifique tue la science.....Je veux que nous fassions nous-mêmes toutes nos machines..... J'aime mieux que nos instruments ne soient point si parfaits et si justes, et que nous ayons des idées plus nettes de ce qu'ils doivent être, et des operations qui doivent en résulter. Pour ma première leçon de statique, au lieu d'aller chercher des balances, je mets un bâton en travers sur le dos d'une chaise, je mesure la longueur des deux parties du bâton en équilibre, j'ajoute de part et d'autre des poids, tantôt egaux, tantôt inégaux; et, le tirant ou le poussant autant qu'il est nécessaire, je trouve enfin que l'équilibre résulte d'une proportion réciproque entre la quantité des poids et la longueur des leviers.' And again: '*Sans contredit ou prend des notions bien plus claires et bien plus sûres des choses qu'on apprend ainsi de soi-même, que de celles qu'on tient des enseignements d autrui.*'* In this sentence Rousseau sounds the key note of the true educational method, but in its application to science the pupil may proceed somewhat further than may have been thought possible a century ago.

In order that the pupil may fully realize the results of his own simple experiments, he may, even at this early stage of his scientific progress, learn the use of squared paper for graphically expressing the relation between two varying and dependent factors. Dr. Wormell, in the preface to a little book on 'Plotting,' points out that 'although the educational methods which are associated with the name of Fröbel have been brought very near to perfection in the Kindergarten, they are to a great extent suspended when the pupil passes from the infant school.' The use of squared paper in designing patterns is well known in Kindergarten exercises, and also in the experimental science classes of technical schools. It might be made to serve equally useful purposes in the teaching of rudimentary science in elementary schools. If we take a simple pully experiment, as an example, the pupil might easily note the exact weights that balance each other in different trials, and then by registering the results see how nearly he could arrive at the theoretical law. After a time, the pupil would succeed in obtaining the true law for the apparatus in use, and the divergence of this law from the theoretic law might yield useful suggestions for other lesssons. Other simple experiments might lead to the graphical representation of the law of falling bodies, and to the relation between the pressure and volume of a gas under constant temperature. But such instruction would necessarily be restricted to the highest standards, and might, perhaps, be more appropriately given in schools of a higher grade.

To provide every elementary school, having upper standards, with a teacher competent to give scientific instruction on the lines I have indicated, and with the necessary apparatus, might be considered as involving an unjustifiable expenditure of public funds. In Birmingham, Liverpool, and recently in London, a very successful attempt has been made to overcome this difficulty by appointing a teacher of high attainments with a wide knowledge of his subject, and skilled in the methods of instruction, to go round from school to school, and to give science lectures to the children and their teachers. This peripatetic philosopher

* Emile, Livre III.

carries with him his apparatus, and visits in turn all the chief schools of the town or district. The experiments are carefully prepared at the central depôt, and the lessons are given once a week or once a fortnight. Nothing could exceed the interest which these lessons arouse. Nevertheless, the system, notwithstanding the economy of teaching power, has many drawbacks, and ought to be regarded as temporary only, to be discontinued as soon as the ordinary school teachers shall be as well qualified to teach science as history or grammar. What is true of the workshop instructor is still more true of the science teacher, viz., that he should not be a specialist having no share in the general education of the child, but one of the ordinary class teachers. We may take it for granted, as pointed out by Dr. Butler, of New York, 'that any subject which is taught by a special teacher is regarded as an excrescence on the regular curriculum, and as not standing on the same level with reading, writing and arithmetic.'*

Another defect of the system is, that the children are not made sufficiently familiar with the apparatus which is used in the experimental lectures. Of the ordinary science teachers of the present day, it has been said: 'As a rule, even now, the teacher stands before a blackboard and behind a row of bottles and chalks, and talks and mixes, and calls it chemistry, or involves himself in a tangle of wires and brass and ebonite fittings, and calls it electricity.' The itinerant teacher is at a still greater disadvantage. He brings with him the apparatus required to illustrate his demonstrations, but, unfortunately, he takes it away again, and the children are apt to look upon his experiments as clever tricks which *he* may be able to perform but which *they* cannot. To learn science properly the pupil must himself perform the experiments. He needs to be brought not only face to face, but into hand to hand contact, with nature's operations. It is in the practice of science that its chief value lies. A repetition of the lesson by one of the teachers would be very serviceable if the experiments could also be repeated, and if the children could take part in them; but otherwise there is a want of reality about the teaching which deprives it of some of its educational value. The advantage, however, of such instruction in awakening the intelligence and of stimulating a spirit of scientific enquiry, even if the method of teaching is not as perfect as it might be, cannot be over-estimated.

Systematic science teaching by experimental methods can be given only in the highest standards of Elementary Schools; and there is much to be said in favour of drafting the children of these standards into higher Elementary or Graded Schools, where the more expensive fittings and apparatus which are needed for practical teaching can be more economically provided.

I have now indicated some of the changes needed in our Elementary teaching to make it a more fitting preparation than it is at present for subsequent Technical Instruction. There is reason to hope that many of the suggestions contained in these articles will be embodied in the recommendations of the Royal Commissioners appointed to enquire into the working of the Education Acts, whose Report will probably be presented to Parliament before this article is published. Except as regards workshop instruction, and possibly as regards that also, nearly all the suggestions I have made are in every way as applicable to girls as to boys. The analogy between needlework and woodwork has been frequently pointed out; but in addition to needlework girls even now receive what may be regarded as Technical Instruction in cookery and domestic economy. But as regards our future artizans, no great improvement can be effected in their education and in their fitness to engage in the several crafts and occupations on which the industrial progress of the country so greatly depends, unless the instruction which they receive in our elementary schools is practical in character, and based on the now generally recognised educational principle, that the child must be intellectually stimulated, not so much by literary studies as by bringing his mind, through the medium of his hands and eyes, into direct contact with the objects that surround him.

* Report of President of 'Industrial Education Association.' May, 1888. New York.

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Pestalozzi.

BY THE REV. CANON WARBURTON, M.A.,
Formerly Her Majesty's Inspector of Training Colleges for Schoolmistresses.

CHAPTER IV.—*continued.*

'1821.

'Pestalozzi completed this day his 76th year. His grey hair, his careworn countenance, his hollow eye and bent figure, proclaim that many days, and those days of trouble, have passed over his head. His heart, however, seems still young—the same warm and active benevolence, the same unconquerable hope, the same undoubting confidence, the same generous self-abandonment animate it now, that have led to the many sacrifices and have supported him under the many difficulties and trials of his eventful life. In a thousand little traits of character, which unconsciously escape him, I read the confirmation of his history. It is an affecting sight when the venerable object of the admiration of emperors and princes appears in the midst of his adopted children. Rich and poor, natives and foreigners alike, share his paternal caress and regard him with the same fearless attachment.

'From the sacrifice of home, property, and health for the benefit of a people who do not understand his merit, to the picking up of a child's plaything or the soothing of an infant's sorrow, Pestalozzi is ever prompt to obey the call of humanity and kindness. The sentiment of love reigns so powerfully in his heart, that acts of the highest benevolence or of the most condescending good nature seem to require no effort, but appear the spontaneous manifestations of the one overruling principle.

'I must tell you an anecdote which, simple as it is, shows at once the warmth and the weakness which characterize his benevolence. He was going to visit some friends at Berne, furnished with as much money as he was likely, under such circumstances, to want. According to his usual practice, he falls into conversation with the first peasant to whom he has an opportunity of speaking. He inquires into his means of subsistence, the number of his children, the wants and distresses of his family, and so forth. Becoming interested in the man's little story, Pestalozzi gives him the larger portion of the money which he has about him. A similar case soon afterwards presents itself,

and the second *rencontre* drains his pocket of the last *kreutzer*.* He had nearly reached Berne, when a wretched-looking mendicant comes up to him soliciting relief. Again he fumbles in his pocket, but it is now in vain. What is to be done? He remembers that his buckles are of silver; he hastily takes them from his shoes, thrusts them into the beggar's hand, and drives off.

'Though regarded in Germany as the most extraordinary luminary, and the profoundest practical philosopher of the age; though honoured with the most flattering testimonies of esteem and approbation by courts and universities, Pestalozzi is the most modest and unassuming of men. To all who take an interest in his method of education he addresses himself in the most touching expressions of gratitude, as if they conferred the greatest obligation by examining into the truth of his opinions and the utility of his plans.

'Never shall I forget my first introduction to him. He had been long expecting me, and his lively imagination had anticipated in different manners the probable results of our connection. "Will he like me? Do you think I shall suit him?" were questions he was perpetually putting to our common friend. I had no sooner arrived than he hurried to meet me, and though I understood not the words he uttered,† yet the tone of kindness, the affectionate pressure of the hand, the expression of benignity which lit up his countenance, all assured me I was welcome. Twenty times he rose from his seat, paced with quick, but shuffling step across the room; then, as if suddenly recollecting himself, hastened to place himself near me, to press once more both my hands in his, and to mutter some unintelligible expressions of goodwill.

'In one of the first conversations we had together, he told me how delighted he was that the English began to pay attention to his system, remarking that that union of exalted sentiments with practical good sense which characterizes the nation renders it the most competent to appreciate and execute his plans. "Examine my method," continued he, with his noble candour, "adopt what you find to be good, and reject what you cannot approve. We are doing something here towards the execution of my principles of education, but what we do is still very imperfect: it is in England that my views will be eventually realized."

'You cannot conceive the interest which Pestalozzi awakens, or the influence which he insensibly acquires. All the little barriers behind which reserve or suspicion teach us to intrench ourselves, fall before the childlike simplicity, the unaffected humility, and the feminine tenderness of his heart. Self-interest is shamed into silence while we listen to the aspirations of his boundless benevolence, and if one spark of generous feeling glows in the bosom, the elevated enthusiasm of his character must blow it into a flame. The powers of his original mind serve to maintain the interest which his character first excites. In conversation however, he is most frequently a listener. Towards those with whom he lives in perfect intimacy he sometimes indulges in a playful but forcible raillery—careful, meanwhile to avoid giving the slightest pain or uneasiness. He is peculiarly successful in portraying some great character by two or three masterly strokes: in marking, either in retrospect or by anticipation, the influence of political events on national character or national prosperity; in characterizing the different methods of education in vogue; or in tracing the difference between his (own) views and those of certain philosophers with which they have been confounded.

'There is nothing studied about him. Often as I have heard him enter upon the subject of his system for the information of strangers, I do not recollect him to have taken it up twice from the same point of view. When we have conversed on these subjects, I have sometimes thought his ideas wild and his views impracticable. The faint and misty, but still beautiful light which emanates from his mind I have regarded with a feeling of melancholy delight, for it seemed to indicate that the sun of his genius had set. Still I have been unable to dismiss from my mind his loose and ill digested hints: after frequent reconsiderations of them they have appeared more clear and more feasible, and I have subsequently traced their influence in the opinions I have adopted and in the plans of instruction which I have pursued.

'Pestalozzi once known is never forgotten. I have talked with men who have not seen him for years, or whom the current of events has separated from all intercourse with him. His honoured image lives as fresh in their memory as if their communication had never been suspended or broken. Anecdotes illustrating his benevolence are current in their families, and their children anticipate the delight of one day receiving the parental caress of good Father Pestalozzi. Many of my own countrymen, who have enjoyed the privilege of his society, will, I am sure, carry the remembrance of him to their graves. For myself—his unwearied kindness, his affectionate solicitude for my health and comfort, the numberless testimonies of his esteem and regard which I daily receive, are engraven on my heart in characters which can never be effaced.

'It will ever be a source of proud satisfaction to me that Pestalozzi has honoured me with the title of friend; and should I attain, myself, to a good old age, my decline will be cheered with the remembrance that I have contributed, as he himself declares, to shed a happy serenity over the evening of his life.'

Mr. Mayo appears to have, in the first instance, attached himself to Pestalozzi's staff without any ulterior object; but the idea gradually dawned upon him of first imbuing himself thoroughly with the principles of the great master, and then returning home and establishing a Pestalozzian School in England, free from the oddities, the irregularities, the waste, the dissensions, and, alas! the *dirt*, of the famous Swiss institution. In a letter dated Jan., 1820, he talks of 'setting up a Pestalozzian menagerie of his own.' 'The die,' he writes, Oct., 1820, 'is cast for me: I am a Pestalozzian through life, with no other temporal object but the establishment of this method of education in my own country.' In this idea he was strongly encouraged by Pestalozzi himself, whose great ambition and desire was that his principles should be planted in England, where he thought the conditions peculiarly favourable to their taking root.

When Mr. Mayo left him, Pestalozzi presented to him, among other parting gifts, a screen, now in the possession of Miss Mayo, with a likeness of himself in his own study at Yverdun, and with pictures on the

* Kreutzer, a German coin worth a little more than a farthing.

† The writer did not, at this time, understand German.

carries with him his apparatus, and visits in turn all the chief schools of the town or district. The experiments are carefully prepared at the central depôt, and the lessons are given once a week or once a fortnight. Nothing could exceed the interest which these lessons arouse. Nevertheless, the system, notwithstanding the economy of teaching power, has many drawbacks, and ought to be regarded as temporary only, to be discontinued as soon as the ordinary school teachers shall be as well qualified to teach science as history or grammar. What is true of the workshop instructor is still more true of the science teacher, viz., that he should not be a specialist having no share in the general education of the child, but one of the ordinary class teachers. We may take it for granted, as pointed out by Dr. Butler, of New York, 'that any subject which is taught by a special teacher is regarded as an excrescence on the regular curriculum, and as not standing on the same level with reading, writing and arithmetic.'*

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'From the sacrifice of home, property, and health for the benefit of a people who do not understand his merit, to the picking up of a child's plaything or the soothing of an infant's sorrow, Pestalozzi is ever prompt to obey the call of humanity and kindness. The sentiment of love reigns so powerfully in his heart, that acts of the highest benevolence or of the most condescending good nature seem to require no effort, but appear the spontaneous manifestations of the one overruling principle.

'I must tell you an anecdote which, simple as it is, shows at once the warmth and the weakness which characterize his benevolence. He was going to visit some friends at Berne, furnished with as much money as he was likely, under such circumstances, to want. According to his usual practice, he falls into conversation with the first peasant to whom he has an opportunity of speaking. He inquires into his means of subsistence, the number of his children, the wants and distresses of his family, and so forth. Becoming interested in the man's little story, Pestalozzi gives him the larger portion of the money which he has about him. A similar case soon afterwards presents itself,

and the second *rencontre* drains his pocket of the last *kreutzer*.* He had nearly reached Berne, when a wretched-looking mendicant comes up to him soliciting relief. Again he fumbles in his pocket, but it is now in vain. What is to be done? He remembers that his buckles are of silver; he hastily takes them from his shoes, thrusts them into the beggar's hand, and drives off.

'Though regarded in Germany as the most extraordinary luminary, and the profoundest practical philosopher of the age; though honoured with the most flattering testimonies of esteem and approbation by courts and universities, Pestalozzi is the most modest and unassuming of men. To all who take an interest in his method of education he addresses himself in the most touching expressions of gratitude, as if they conferred the greatest obligation by examining into the truth of his opinions and the utility of his plans.

'Never shall I forget my first introduction to him. He had been long expecting me, and his lively imagination had anticipated in different manners the probable results of our connection. "Will he like me? Do you think I shall suit him?" were questions he was perpetually putting to our common friend. I had no sooner arrived than he hurried to meet me, and though I understood not the words he uttered,† yet the tone of kindness, the affectionate pressure of the hand, the expression of benignity which lit up his countenance, all assured me I was welcome. Twenty times he rose from his seat, paced with quick, but shuffling step across the room; then, as if suddenly recollecting himself, hastened to place himself near me, to press once more both my hands in his, and to mutter some unintelligible expressions of goodwill.

'In one of the first conversations we had together, he told me how delighted he was that the English began to pay attention to his system, remarking that that union of exalted sentiments with practical good sense which characterizes the nation renders it the most competent to appreciate and execute his plans. "Examine my method," continued he, with his noble candour, "adopt what you find to be good, and reject what you cannot approve. We are doing something here towards the execution of my principles of education, but what we do is still very imperfect: it is in England that my views will be eventually realized."

'You cannot conceive the interest which Pestalozzi awakens, or the influence which he insensibly acquires. All the little barriers behind which reserve or suspicion teach us to intrench ourselves, fall before the childlike simplicity, the unaffected humility, and the feminine tenderness of his heart. Self-interest is shamed into silence while we listen to the aspirations of his boundless benevolence, and if one spark of generous feeling glows in the bosom, the elevated enthusiasm of his character must blow it into a flame. The powers of his original mind serve to maintain the interest which his character first excites. In conversation however, he is most frequently a listener. Towards those with whom he lives in perfect intimacy he sometimes indulges in a playful but forcible raillery—careful, meanwhile to avoid giving the slightest pain or uneasiness. He is peculiarly successful in portraying some great character by two or three masterly strokes: in marking, either in retrospect or by anticipation, the influence of political events on national character or national prosperity; in characterizing the different methods of education in vogue; or in tracing the difference between his (own) views and those of certain philosophers with which they have been confounded.

'There is nothing studied about him. Often as I have heard him enter upon the subject of his system for the information of strangers, I do not recollect him to have taken it up twice from the same point of view. When we have conversed on these subjects, I have sometimes thought his ideas wild and his views impracticable. The faint and misty, but still beautiful light which emanates from his mind I have regarded with a feeling of melancholy delight, for it seemed to indicate that the sun of his genius had set. Still I have been unable to dismiss from my mind his loose and ill digested hints: after frequent reconsiderations of them they have appeared more clear and more feasible, and I have subsequently traced their influence in the opinions I have adopted and in the plans of instruction which I have pursued.

'Pestalozzi once known is never forgotten. I have talked with men who have not seen him for years, or whom the current of events has separated from all intercourse with him. His honoured image lives as fresh in their memory as if their communication had never been suspended or broken. Anecdotes illustrating his benevolence are current in their families, and their children anticipate the delight of one day receiving the parental caress of good Father Pestalozzi. Many of my own countrymen, who have enjoyed the privilege of his society, will, I am sure, carry the remembrance of him to their graves. For myself—his unwearied kindness, his affectionate solicitude for my health and comfort, the numberless testimonies of his esteem and regard which I daily receive, are engraven on my heart in characters which can never be effaced.

'It will ever be a source of proud satisfaction to me that Pestalozzi has honoured me with the title of friend; and should I attain, myself, to a good old age, my decline will be cheered with the remembrance that I have contributed, as he himself declares, to shed a happy serenity over the evening of his life.'

Mr. Mayo appears to have, in the first instance, attached himself to Pestalozzi's staff without any ulterior object; but the idea gradually dawned upon him of first imbuing himself thoroughly with the principles of the great master, and then returning home and establishing a Pestalozzian School in England, free from the oddities, the irregularities, the waste, the dissensions, and, alas! the *dirt*, of the famous Swiss institution. In a letter dated Jan., 1820, he talks of 'setting up a Pestalozzian menagerie of his own.' 'The die,' he writes, Oct., 1820, 'is cast for me: I am a Pestalozzian through life, with no other temporal object but the establishment of this method of education in my own country.' In this idea he was strongly encouraged by Pestalozzi himself, whose great ambition and desire was that his principles should be planted in England, where he thought the conditions peculiarly favourable to their taking root.

When Mr. Mayo left him, Pestalozzi presented to him, among other parting gifts, a screen, now in the possession of Miss Mayo, with a likeness of himself in his own study at Yverdun, and with pictures on the

* Kreutzer, a German coin worth a little more than a farthing.

† The writer did not, at this time, understand German.

study walls, of Stanz, of 'Gertrude teaching her Children,' and of a green and flourishing tree, representing his own never-dying hope. He also conferred upon Mr Mayo a sort of testimonial, written in German of the most involved and clumsy character possible, which concludes thus:—

'He has, with great readiness, deep insight, and gratifying success, aided me in my pursuit of the main object of my life; in regard to which, by his unprejudiced, calm, and at the same time cordial behaviour, he has attained to a very intimate and thorough familiarity with our purposes, principles, and methods, and especially with the peculiarities of our system of education and instruction. So much has this been the case, that I have long since learned to regard him as a matured and benevolent counsellor in my own domestic concerns.

'I am convinced that, as his presence has proved a blessing to myself and to my house, it will also (through his mature insight into our efforts and his firm conviction of the great and essential advantages which some, at least, of them offer) prove, in time to come, a blessing also to his native land, so wont to embrace with vigour, and promote with liberality, every good movement which comes under its notice. His noble heart cherishes this desire as warmly as his intellect grasps the means of attaining it in all its purity, depth, and manysidedness.

'God be with you, my dear, dear friend! May my heartful thanks, my sincerest affection, and the ardent longing once again to meet you in this world, and once again by your side to indulge hopes which can only be fulfilled beyond the grave, accompany you on your way, and bring you happily home to your fatherland and to the mother whom you love so heartily and so filially,

'PESTALOZZI.

'*Yverdun, Switzerland, April, 8th, 1822.*'

(To be continued.)

—o—

The Glass of Water; or, Cause and Effect.

(Comedy in Five Acts.)

LE VERRE D'EAU; OU, LES EFFETS ET LES CAUSES.

(Comédie en Cinq Actes.)

Scene II.—(*continued*).

Bolingbroke.

Qu'y aurait-il d'étonnant?...	What would there be astonishing in that?
La reine Anne, notre charmante souveraine,	Queen Anne, our adorable Sovereign lady,
est une personne fort respectable et fort sage,	is a very respectable and prudent lady,
qui s'ennuie royalement...	who is sovereignly wearied...
je veux dire autant que possible...	I mean as much as possible...
mais à sa cour, on s'amuse beaucoup!...	but at her court, there is much amusement.
toutes nos ladys ont de petits protégés,	All our ladies have their little protégés,
de jeunes officiers fort aimables,	amiable young officers,
qui, sans quitter le palais de Saint-James,	who, without setting foot out of St. James's,
arrivent à des grades supérieurs.	are promoted to high rank.

Masham.

Monsieur!...	Sir!

Bolingbroke.

Fortune d'autant plus flatteuse qu'elle n'est due qu'au mérite personnel.	A piece of good luck all the more flattering because it is due to personal merit alone.

Masham.

Ah! c'est une indignité... et si je savais...	Ah! that is a shame! If I knew...

Bolingbroke.

[*allant s'asseoir près de la table à gauche.*	[*seating himself at a table on the left*
Après cela...je peux me tromper,	Well...I may be deceived,
et si réellement c'est quelque grand seigneur	and if really it is some great lord
ami de votre père...	your father's friend...
laissez venir les évènements...	let things take their course...
laissez-vous faire!	let them do it for you!
Ah! si on vous ordonnait de vous marier...	Ah! if you were ordered to marry...
je ne dis pas...	that would be another affair...
mais on vous le défend...	but you are forbidden to do so.
il est clair que ce n'est pas un ennemi...	It is plain that it is not an enemy...
au contraire...et lui obéir n'est pas si difficile.	quite the contrary...and to obey is not so difficult.

Masham.

[*debout près du fauteuil où est assis Bolingbroke.*	[*standing near the arm-chair in which Bolingbroke is seated.*
Mais si vraiment...	But I beg your pardon it is...
quand on aime quelqu'un...	when one loves someone
quand on est aimé...	and when one is loved (in return).

Bolingbroke.

J'y suis!...	I see it now!
l'objet de vos rêves!	the subject of your dreams!
la personne à qui vous pensiez tout à l'heure en dormant.	The person about whom you were dreaming just now.

Masham.

Oui, monsieur—la plus aimable,	Yes, sir...the most amiable,
la plus jolie fille de Londres,	the prettiest girl in London,
qui n'a rien..:ni moi non plus...	who has nothing...nor I either...
et c'est pour elle que je désire les honneurs et la richesse...	it is for her that I long for riches and honours...
j'attends, pour l'épouser,	I am waiting, in order to marry her,
que j'aie fait fortune...	until I have made my fortune...

Bolingbroke.

Vous n'êtes pas encore très-avancé...	You have not made much progress as yet...
et elle de son côté?	and what has she done?

Masham.

Bien moins encore!...	Much less still!...
orpheline comme moi,	an orphan like myself,
demoiselle de boutique dans la Cité,	a shopwoman in the City...
chez un riche joaillier...	in a rich jeweller's shop...
maître Tomwood...	Mr. Tomwood's...

Bolingbroke.

Ah, mon Dieu!	Good heavens!

Masham.

Qui vient de faire banque-route...
Who is just bankrupt...

Elle se trouve sans place et sans ressource.
She finds herself without a place and without resources.

Bolingbroke.

[*se levant.*
[*rising.*

C'est la petite Abigaïl...
It is little Abigail...

Masham.

Vous la connaissez?
Do you know her?

Bolingbroke.

Parbleau, du vivant de ma femme...
Of course I do, during the lifetime of my wife...

je veux dire quand elle vivait près de moi...
I mean when she lived with me...

j'étais un abonné assidu des magasins de Tomwood...
I was a regular customer at Tomwood's shops...

ma femme aimait beaucoup les diamants,
my wife was very fond of diamonds

et moi, la bijoutière...
and I liked jewelery...

Vous avez raison, Masham, une fille charmante, naïve, gracieuse, spirituelle...
You are right, Masham, she is a charming, artless, graceful, clever girl...

Masham.

Eh! mais, à la manière dont vous en parlez...
Yes, but, from the way in which you speak of her...

est-ce que vous en auriez été amoureux?...
you do not mean to say you were in love with her?

Bolingbroke.

Pendant huit jours! et peut-être plus!
During eight days! and perhaps longer!

si je n'avais pas vu
If I had not perceived

que je perdais mon temps...
that I was losing my time...

et je n'en ai pas à perdre...
and I have none to lose (spare)...

maintenant surtout...
now especially...

mais j'ai gardé à cette jeune fille...
but I have retained for that young girl...

une amitié véritable,
a real friendship,

et voici la première fois
and this is the first time

que j'éprouve un regret...
that I feel regret...

non d'avoir perdu ma fortune,
not for having lost my fortune

mais de l'avoir si mal employée...
but for having employed it so badly...

je serais venu à votre aide...
I would have helped you...

je vous aurais mariés...
I would have helped you to marry...

mais pour le présent des dettes,
but at present debts,

des créanciers qui sortent de dessous terre...
creditors who spring up out of the earth...

et pour l'avenir pas même l'espérance...
and for the future not even one hope...

les biens de ma famille reviennent tous
the possessions of my family all revert

à Richard Bolingbroke, mon cousin,
to Richard Bolingbroke, my cousin,

qui n'a pas envie de me les laisser...
who has no wish to leave them to me...

car, par malheur, il est jeune,
for, unfortunately, he is young,

et comme tous les sots
and like all fools

il se porte à merveille...
his health is wonderfully good...

mais nous pourrions peut-être à la cour...
but we might perhaps be able at the Court

chercher pour Abigaïl.
to find something for Abigail.

Masham.

C'est ce que je disais...
Just what I said...

une place de demoiselle de compagnie,
a companion's place,

près de quelque grande dame
with a noble lady,

qui ne soit ni impérieuse, ni hautaine...
who would be neither imperious, nor haughty...

Bolingbroke.

[*secouant la tête.*
[*shaking his head.*

Ce n'est pas aisé à trouver.
It is not easy to find.

Masham.

J'avais pensé à la vieille duchesse de Northumberland, qui, dit-on, cherche une lectrice.
I had thought of the old Duchess of Northumberland, who, it is said, requires a reader.

Bolingbroke.

Cela vaut mieux...
That's better...

elle n'est qu'ennuyeuse à périr.
she is only tiresome to death.

Masham.

Et j'avais conseillé à Abigaïl de se présenter chez elle, ce matin;
I had advised Abigail to go and see her this morning;

mais l'idée seule de venir au palais de la reine la rendait toute tremblante.
but the bare idea of coming to the Queen's palace made her tremble.

Bolingbroke.

N'importe...l'espoir de vous y trouver,
No matter...the hope of seeing you here,

elle y viendra... et tenez... tenez...
she will come...and look! look!...

monsieur l'officier des gardes, que vous disais-je?...la voici.
my gentleman of the guards, what did I tell you?...here she is.

(To be continued.)

Pupil Teacher Examination Papers (Scotland).

31ST MARCH, 1888.

END OF FOURTH YEAR.

FIRST PAPER.

(Two hours and a half allowed for this Paper.)

Dictation.

Write from dictation, in a neat hand, with correct spelling and punctuation, the passage read by the Inspector.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word 'Parenthetically.'

Write in small hand, as a specimen of copy-setting, the sentence 'In Saxon strength that Abbey frown'd.'

Arithmetic.

MALES.

1. A can do a piece of work in 4 days; B can do it in 6 days; A, B, and C, can do it in $1\frac{1}{2}$ days. In what time could C do it?

(*a*) A can do $\frac{1}{4}$ or $\frac{3}{12}$ in 1 day.
B ,, $\frac{1}{6}$ or $\frac{2}{12}$,,
A and B together do $\frac{5}{12}$ in 1 day.

(*b*) Now A, B, and C can do $\frac{1}{1\frac{1}{2}}$ or $\frac{8}{12}$ in one day.

∴ C will do $\frac{8}{12} - \frac{5}{12}$ or $\frac{1}{4}$ in 1 day, and hence the whole in 4 days. Ans.

2. Bought paper at 12s.; at what price must I sell it, and give six months' credit at 5 per cent. simple interest, so as to gain 10 per cent.?

(*a*) Interest of 12s. for 6 mos. at 5 per cent. $= \frac{12s. \times 6 \times 5}{1200}$
,, ,, ,, ,, $= \frac{3}{10}$s.
Amount ,, ,, ,, $= 12\frac{3}{10}$s.

£ £ s.

(*b*) 100 : 110 :: $12\frac{3}{10}$: price required.

$\frac{123s.}{10} \times \frac{110}{100} = \frac{13533}{1000} = 13s.\ 6\frac{11}{12}d.$ Ans.

FEMALES.

1. Explain the terms *rate per cent.*, *Three per Cents.*, *true discount*, *Consols*, *brokerage*.

Rate per cent. is the interest of £100 for one year.

Three per Cents. mean documents in the Government Stocks, *nominally* worth £100, which yield 3 per cent. of interest.

True discount is the difference between the principal and the amount of the principal after a certain time, and at a certain rate per cent.

Consols is short for 'Consolidated,' all the different loans contracted by the Government having been put in large loans according to interest paid.

Brokerage is a small charge per cent. made by stockbrokers on the purchase of Stocks.

2. Find the difference between the simple and compound interest on £520 for 3 years at 5 per cent.

(*a*) Compound interest.

5 % = $\frac{1}{20}$ of prin. yearly	£520	0	0	prin.	or 1st year.
$\frac{1}{20}$	26	0	0	int.	,, ,,
	546	0	0	prin.	,, 2nd year.
$\frac{1}{20}$	27	6	0	int.	,, ,,
	573	6	0	prin.	,, 3rd year.
$\frac{1}{20}$	28	13	3·6	int.	,, ,,
	601	19	3·6	amt. at end of 3 yrs.	
	520				
	£81	19	3·6	comp. int. of 3 years.	

(*b*) Simple int. = $\frac{£520 \times 5 \times 3}{100}$ = £78.

(*c*) Diff. bet. simp. and comp. int. = £81 19s. 3·6d. − £78.
= £3 19s. 3·6d. Ans.

3. If oranges be bought at 10 for a penny, how many should be sold for 2s. 2d. to gain 30 per cent.?

(*a*) 2s. 2d. will purchase 260 when 10 cost 1d.

(*b*) ∴ 100 : 130 :: 260 : number required.

$\frac{260 \text{ oranges} \times 130}{100}$ = 338. Ans.

4. The total number of forenoon and afternoon attendances made by a class of 60 during a week, with one half-holiday, was 514; find the average attendance for the week, and the per centage absent.

(*a*) 514 divided by 9 (the number of times school has been open) will give the average number in attendance.

$\frac{514}{9}$ = 57·1 or 57 av. att. Ans.

(*b*) Possible number of attendances = 60 × 9 = 540.

∴ 540 : 26 :: 100 : per cent. absent.

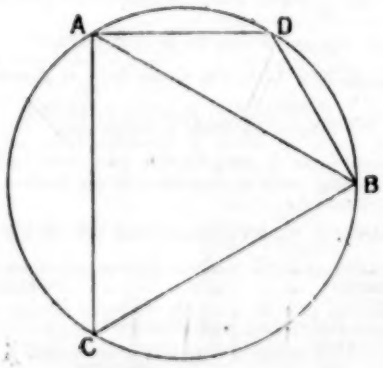
$\frac{26 \times 100}{540}$ = 4·8 really 5 per cent. Ans.

Euclid.

1. Parallelograms on the same base and between the same parallels are equal to one another. Bk. I., Prop. 35.

2. The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles. Bk. III., Prop. 22.

3. A triangle is inscribed in a circle; show that the sum of the angles in the three segments exterior to the triangle is equal to four right angles.



Let the triangle ABC be inscribed in the circle ACB.

Let ADB be the angle in one of the segments exterior to the triangle.

By Prop. 22, Bk. III., the angles ADB, ACB are together equal to two right angles. In the same manner any of the angles in the segments together with the opposite angle of the triangle are together equal to two right angles.

That is, the three angles of the triangle together with the three angles in the segments are equal to six right angles. But the angles of the triangle are (I. 32) equal to two right angles, therefore the sum of the angles in the three segments must be equal to four right angles. Q.E.D.

Algebra and Mensuration.

1. Find the value of $(a - b)[x^3 - 2ax^2 + a^2x - (a + b)b^2]$, when $a - b = x = 3$, and $a + b + x = 2$.

By evaluating a, b and x, we get $a = 1$; $b = -2$; and $x = 3$.

$\therefore (a - b)[x^3 - 2ax^2 + a^2x - (a + b)b^2] =$
$[1 - (-2)][3^3 - 2 \times 1 \times 3^2 + 1^2 \times 3 - (1 - 2)(-2)^2] =$
$3[27 - 18 + 3 - (-1)4] =$
$3(12 + 4) =$ 48. Ans.

2. Solve the equations:—

(*a*) $\frac{2x}{3} + y = 16$; $x + \frac{y}{4} = 14$.

(*b*) $3x^2 + 7x - 6 = 0$.

(*a*) (1) $\frac{2x}{3} + y = 16$ or $4x + 6y = 96$

(2) $x + \frac{y}{4} = 14$ or $4x + y = 56$

$5y = 40$

$y =$ 8. Ans.

From (2) $x + 2 = 14$ or $x =$ 12. Ans.

(*b*) $3x^2 + 7x - 6 = 0$

$x^2 + \frac{7x}{3} = 2$

Completing sq. $x^2 + \frac{7x}{3} + \frac{49}{36} = 2 + \frac{49}{36} = \frac{121}{36}$

Taking root $x + \frac{7}{6} = \pm \frac{11}{6}$

$x = \pm \frac{11}{6} - \frac{7}{6} = \frac{4}{6}$ or -3. Ans.

3. The sides of a triangular field are 140, 176, and 300 yards respectively; find its annual value at £5 0s. 10d. per acre.

Half perimeter of triangle = 308

∴ area of triangle $= \sqrt{308 \times 132 \times 168 \times 8}$
$= \sqrt{54641664}$
= 7392 sq. yds.

sq. yds. sq. yds.

∴ 4840 : 7392 :: £5 0s. 10d. : yearly value.

$\frac{1210\text{d.} \times 7392}{4840}$ = 1848d. = £7 14s. Ans.

Grammar.

'Yet O, the *thought*, *that* thou art safe, and *he!*
That thought is joy, *arrive what* may to me.
And, while the wings of fancy still are *free*,
And I can *view* this mimic show of thee,
Time has *but half* succeeded in his theft.—
Thyself removed, thy power to soothe me left.'

1. Analyse the above passage.

2. Parse fully the words in italics.

ANALYSIS.

SENTENCES	KIND	CONNECTIVE	SUBJECT	PREDICATE	OBJECT	EXTENSIONS
1. (Yet O, the thought) that thought is joy	Prin.		that thought	is joy		
2. That thou art safe	subord. noun to (1)	that	thou	art safe		
3. And (that) he (is safe)	subord. noun to (1)	and (that)	he	(is safe)		
4. arrive what may to me	Prin.	what	what (ever)	may arrive	to me (indirect)	
5. and time has but half succeeded in his theft	Prin.	and	time	has succeeded		but half (degree) in his theft (purpose)
6. while the wings of fancy still are free.	subord. adv. to (5)	while	the wings of fancy	are free		still (time)
7. and (while) I can view this mimic show of thee	subord. adv. to (5)	and (while)	I	can view	this mimic show of thee	
8. (Though thou) thyself (be) removed	subord. adv. to (9)	(though)	(thou) thyself	(be) removed		
9. Yet thy power to soothe me (is) left.	Prin.	yet	thy power to soothe me	is left.		

PARSING.

that—subord. conj., introd. subord. noun sent.
Thought—abstr. noun, neut., sing., nom. indep. or subj. of (is).
he—pers. pron., 3rd pers., mas., sing., nom., subj. of (is).
arrive—reg. intrans. verb, infin., pres., gov. by 'may.'
what—indirect interrog. pron. (= whatever), sing., neut., nom. subj. of 'may arrive.'
free—predic. adj., qual. 'wings.'
view—reg. trans. verb, infin., pres., gov. by aux. 'can.'
but—adv. of deg. mod. 'half.'
half—adv. of deg. mod. 'has succeeded.'
thyself—comp. emphat. pers. pron. emphasising (thou), or nom. absol.

Note.—'Thyself removed' might be considered a nom. absolute.

3. From what languages have we received the following words:—cargo, jubilee, ridicule, calico, skipper, cocoa, chemistry, sugar, and dale? Give the root where you can.

WORD.	LANGUAGE.	ROOT.
cargo	Spanish	——
jubilee	Hebrew	——
ridicule	Latin	rideo
calico	Indian	Calicut
skipper	Dutch	schip
cocoa	Portuguese	coco
chemistry	Greek	chemeia
sugar	French	sucre
dale	Saxon	dæl

4. Into what periods may the history of the English Language be conveniently divided? Give the distinguishing features of each.

Dr. Morris divides the history of the English Language into five periods:—

I. English of the First Period (A.D. 450—1100).

(*a*) The grammar of this period is *synthetic* or inflectional, while that of modern English is *analytical*.

(*b*) The vocabulary contains no foreign elements.

(*c*) There was a grammatical gender; substantives were of various declensions, and had five cases; the article was declined; pronouns had a dual number; prepositions governed various cases, and the verb was highly inflected.

II. The English of the Second Period (A.D. 1100 to about 1250).

Changes affecting the *orthography* take place in a general weakening of the terminations of words; older inflections drop off; case endings are discarded; and many simplifications are observed in the southern dialect, while in the other dialects (East and West Midland) even greater simplification is observable; and the influence of Norman-French begins to exhibit itself in the *vocabulary* of the English Language.

III. The English of the Third Period (1250—1350).

Some old inflections are retained in the article; confusion of nouns in gender, number, and case; dual forms of pronouns dropped; *to* before infinitive; final *e* used with adjectives, &c. French words become common especially towards 1350.

IV. The English of the Fourth Period (1350—1460).

The Midland dialect becomes the prevailing one, and northern and southern words still retain their own peculiarities. The plural article sometimes used; the pronouns approach modern forms, and so do verbs. The termination *e* is important from the fact that it represents various inflictions and is used as a mark of the plural or definite adjective, as a mark of adverbs, and as a mark of the infinitive mood, past tense of weak verbs and imperative mood.

Towards the end of this period final *e* becomes irregular, and the northern forms of the pronouns *their, theirs, them*, come into use in the other dialects.

V. The English of the Fifth Period (1460—1520 and 1520 to present time).

Printing is introduced into England by Caxton, and there is a wide diffusion of classical literature.

SECOND PAPER.

Geography.

(*Three hours allowed for this Paper.*)

1. Draw a map of the Gulf of Mexico and the Caribbean Sea, showing the islands. Give one degree of latitude and longitude.

2. Explain why the days are longer in summer than in winter. Show that our division of the year into four seasons does not apply to the whole of the earth's surface.

The north pole of the earth points to the pole-star all through its journey round the sun. At the summer solstice (if a diagram be drawn) it is seen that the inclination of the axis causes the north pole to be fully exposed to the sun; and the sunlit half of the earth includes much more of the northern than of the southern hemisphere. As the earth turns round this sloping axis the north pole and the surrounding parts will continue in sunshine during the entire rotation. Within the Arctic regions the sun will not set, while within the Antarctic regions he will never rise. Anywhere outside the polar regions there will be alternate day and night, but the day and night will not be equal except at the equator. Thus a place in the northern hemisphere will have the day much longer than the night, for it is midsummer; while at the winter solstice when the north pole points away from the sun the very opposite phenomena occur, namely a long night and a short day.

The division of the year will not apply to equatorial regions, for with them there is at least no season corresponding to our winter. The rainy season with them is the only approach to that season. In some of the Pacific Islands there is almost one perpetual spring.

3. Explain the variation in the height of the tidal wave (*a*) at different places, and (*b*) at different phases of the moon.

The great tidal-wave which travels round the earth is an oscillatory wave and not a wave of translation, the water simply rising and falling but not moving onwards. While however this is true of the tidal wave of the ocean, it must be remembered that in narrow seas it becomes converted into an actual wave of translation. Where the channel is contracted, as in a narrow strait, the tide may produce a rapid rush of water, and if it rolls up a narrow estuary the water becomes heaped up and produces a sudden rush into the channel of the river. Such a wave is called a *bore* and is seen in the Bristol Channel at the mouth of the Severn. The original height of the tide-wave is three or four feet, but in some bores the tides are forced up as high as 30, 50, and even to 100 ft. in the Bay of Fundy.

As the sun and moon have both to do with the formation of the tides, when the two come in line and pull together—that is, at full and new moon—the tide is highest and is called *spring tide*: when they are at right angles—that is, at the moon's quarters—the tide is lowest and is *neap tide*.

History.

1. In what reign were the Crowns of England and Ireland united, and in what reign were the Parliaments of Great Britain and Ireland united? Mention the leading circumstances connected with each of these events.

The Crowns of England and Ireland were united in the reign of Henry VIII. Up to that time the kings were styled lords of Ireland. Henry's purpose was to rule Ireland as effectively as he ruled England, and from his accession the Irish lords felt the heavier hand of a master. The Geraldines, who had been suffered to govern Ireland in the name of the Crown, soon discovered that the Crown would no longer be their tool. They resolved to frighten England into a conviction of its helplessness, and a rising ended in discomfiture. The fall of the Geraldines laid Ireland at the mercy of Henry, and in seven years by the conquest of Munster, the submission of Clare, the capture of Athlone, and the victory at Bellahoe, the power of the Crown was acknowledged over the length and breadth of Ireland. Henry's aim was to rule by law and not by force, but the mistake was made of making Ireland English in manners, in law, and in tongue. All government was a copy of English institutions, and every conciliatory measure was tried by Henry to win over the chiefs, and entice them to accept the conditions and titles granted by the English sovereign. The assumption of the title of king of Ireland which followed his quarrel with the Papacy was the fitting crown of the new system. The Parliaments of Great Britain and Ireland were united in the reign of George III., 1801.

In no part of Europe was the evil example of the French Revolution followed so much as in Ireland. Encouraged by the success of the Americans, the 'Volunteers' banded themselves to secure reform in Parliament, but they were dispersed by the skilful tactics of the Government. In 1791 another society, called 'The United Irishmen,' was formed in Belfast for a similar purpose, but it was easily discovered that separation from Britain was meant. The French encouraged them and all seemed ready for an outbreak of rebellion, when the Government, acting on timely information, seized the chiefs, among whom was Lord Edward Fitzgerald. The worst effects of the rising were felt in the south; but General Lake routed the great mass of the rebels at Vinegar Hill, near Enniscorthy. The French sent some 900 troops, who landed at Killala Bay, in Mayo, but they had to surrender in a few weeks (1798).

This rebellion showed the necessity of a closer union with the Empire, and after many debates and much opposition, the union of the Parliaments was accomplished (1801).

2. Name, in order, the chief victories of Nelson. Give a particular account of the battle of Trafalgar, and point out its political results.

Nelson's Chief Victories.

Battle of the Nile, 1798.
Battle of the Baltic, 1801.
Battle of Trafalgar, 1805.

On Monday the 21st of October, when Nelson was near Cape Trafalgar, the enemy was discovered. Nelson told Blackwood, his captain, that he would not be satisfied unless he took twenty of them. Blackwood asked if there was no signal wanting. Nelson replied, that every man knew what they were about. He however gave his last signal, 'England expects every man to do his duty,' and as the telegraphic message was communicated from the Victory, it was greeted with three cheers on board of every ship in the fleet. It was twelve o'clock when this memorable battle began. Nelson's customary signal on going into action, 'Engage the enemy more closely,' was fast belayed at the Victory's mast-head. The British force consisted of twenty-seven sail of the line, four frigates, one schooner, and one cutter; the French and Spaniards united counted thirty-three sail of the line, five frigates, and two brigs. The largest ships on our side were the Victory, the Royal Sovereign, and the Britannia: they mounted 100 guns each. The largest ships on the opposite side were the Principe de Asturias, the Santissima Trinidada of 130 guns, the Santa Anna of 112 guns, and the Rayo of 100 guns. The English had four 98 gun ships and one 80 gun ship. The enemy had six 80 gun ships. Leaving out of the account the frigates and small craft on both sides, Nelson had 2148 guns to oppose to Villeneuve's 2628: his ships were inferior in quality: his superiority lay in the quality of the crews, the long practised skill and bravery of his officers, and his own enthusiasm with which he had inspired every man and boy in in the fleet. The enemy fought bravely, but by three o'clock ten ships of their line had struck, and Admiral Villeneuve was a prisoner. The victory was completed in another half hour; but Nelson had been mortally wounded by a rifle-ball from the mizen-top of a French ship, and he was breathing his last as his sailors were shouting triumphantly. Two Spanish admirals had surrendered. In all, nineteen ships of the line had struck to Nelson at Trafalgar. He died in the arms of his friend Captain Hardy, after uttering these, his last words, 'Thank God I have done my duty.'

Nelson's crowning victory rescued England from invasion, and left her sovereign of the seas.

Composition.

Write an essay *(a)* describing a Saturday excursion with your pupils, or (*b*) on 'The Advantages of Good Manners.'

The Advantages of Good Manners.

Good manners may be shortly defined as good habits, for well-mannered men and women must have been trained to bear themselves well, when boys and girls, by parents and teachers who taught by example and not by precept only. Every one connected with schools can feel what a pleasant thing it is to visit a school where the children are trained to have respect for their elders and for strangers. On the other hand what a pest it is to be in the neighbourhood of a rough unmannerly group of youngsters who delight in bawling nicknames, in tormenting lower animals, in stone throwing, and other ways of annoyance. Teachers are expected to take every means of training the young to 'habits of punctuality, of good manners, and language, of cleanliness and neatness, and also to impress upon the children the importance of cheerful obedience to duty, of consideration and respect for others, and of honour and truthfulness in word and act.' A better summary of what constitutes good manners could scarcely be found.

It is a good policy for young people to cultivate good manners, seeing that many a situation is obtained more through the appearance and demeanour of lads than from the great abilities upon which they may have too confidently prided themselves.

'Worth makes the man and want of it the fellow.'

School Management.

Explain the methods you would follow and the illustrations you would use in introducing a class to the study of Fractions.

THE STUDY OF FRACTIONS.

Having drawn a line on the blackboard, I should divide it into two equal parts; then, after explanation and questioning on what has been done, get the children to see that the two together are equal to the whole.

I should continue by dividing other things, such as apples or oranges, pieces of paper or string, and tell them that the two parts are called *halves*, each of them a *half*, and that two halves make a whole.

The next step in the process would be the division of the line into three equal parts, questioning the pupils in the same manner as before, and getting them to see that three-thirds make up the whole. I should go on with fourths, fifths, &c., till they have a true idea of the different parts, as two-thirds, three-fifths, &c., and how many halves, thirds, fourths, &c., in a whole.

Now might be introduced the expression for a fraction, and referring to the previous way of writing one-half, one-third, &c., I should show that $\frac{1}{2}$ means one something divided into two, $\frac{1}{3}$, one divided into three, $\frac{1}{4}$, one divided into four equal parts. I should now explain that the figure below the line shows into how many parts the object or the line was divided, and the figure above how many of these parts were taken.

We have now reached the stage at which the definition may be given; namely, that 'a fraction (broken part) is a part of a whole,' and then the names of the various fractions given above might be repeated.

By this time they will begin to know that if $\frac{1}{4}$ be taken from a whole, $\frac{3}{4}$ will be left; if $\frac{2}{3}$ be taken from anything, $\frac{1}{3}$ will be left, &c.

Latin.

FOURTH STAGE.

(*The answers to be written on a separate paper.*)

1. Translate into English:—

(*a*.) Hic—tibi *fabor* enim, quando haec te cura remordet,
Longius et volvens fatorum arcana movebo—
Bellum ingens geret Italia, populosque feroces
Contundet; moresque *viris* et moenia ponet,
Tertia dum Latio regnantem viderit aestas,
Ternaque *transierint* Rutulis hiberna subactis.
At puer Ascanius, cui nunc cognomen *Iulo*
Additur,—Ilus erat, dum res stetit Ilia regno,—
Triginta magnos *volvendis* mensibus orbes
Imperio explebit.

(*b*.) Treviri vero atque Indutiomarus totius hiemis nullum tempus intermiserunt, quin trans Rhenum legatos mitterent, civitates sollicitarent, pecunias pollicerentur, magna parte exercitus nostri interfecta multo minorem superesse dicerent partem. Neque tamen ulli civitati Germanorum persuaderi potuit, ut Rhenum transiret.

2. Parse and explain the construction of the words in italics.

Translation.

(*a*) (Know then that) he—for I will speak to thee, since this is the care that torments thee, and I shall unfold the secrets of the fates, by further revelation—he shall wage a mighty war in Italy, and crush the warlike tribes, and impose laws on the nations, and build walls, until the third summer sees him ruling in Latium and the third winter is passed since the conquest of the Rutulians. But the boy Ascanius, now surnamed Iulus,—Ilus was his name so long as Ilia stood in regal power—shall complete a reign of thirty full years, in the cycle of months.

(*b*) On the other hand the Treviri and Indutiomarus allowed no time during the whole winter to pass without sending ambassadors across the Rhine, importuning the citizens, promising sums of money, and declaring that since a great portion of our army was slain a much smaller portion survived. It was impossible, however, to persuade any German state to cross the Rhine.

Parsing.

Fabor—1st person, sing., future, indic. of the defect. verb *fari*, 'to speak.'

Viris—dat., plur., mas., noun, 2nd decl. *vir, -viri*, gov. by 'ponet' under the rule 'That verbs of comparing, giving, &c., gov. acc. and dative.'

Transierint—3rd pers., pl., fut., perf., indic. (because it shall be done after something else shall have taken place), verb of 4th conj., *transeo, -ii* or *-ivi, -itum, -ire*.

Iulo—dat., sing., mas., prop. noun, 2nd dec *Iulus, -i*. The dat. is put the same as 'cui' by attraction.

Volvendis—abl., pl., agr. with 'mensibus,' mas., gerundive, verb, 3rd conj., *volvo, volvi, volutum, volvere*.

3. Explain and illustrate by examples the use of the Latin Supines.

The supine in *um* denotes a purpose and is used only after verbs of motion, as *eo cubitum*, I go to lie down; *venerunt pacem petitum*, they came to sue for peace.

The supine in *u*, properly an ablative of manner, is used only after such adjectives as *facilis, difficilis, credibilis, incredibilis, mirabilis, jucundus, honestus, fas*, and *nefas*, as:—*facile dictu*, easy to say; *jucundum auditu*, pleasant to hear; *nefas est dictu*, it is sinful to say.

4. Translate into Latin:—

While these things are being done by Cæsar, the Nervii, having collected great forces of infantry and cavalry, were preparing to attack Labienus, who, with one legion, was wintering in their territories; and now they were not distant more than a journey of two days, when they learn of the arrival of two legions sent by Cæsar. Accordingly, having pitched their camp, they determined to wait the arrival of the Germans.

Dum haec a Cæsare haec gerunter, Nervii magnis coactis peditatus equitatusque copiis Labienum cum una legione quae in eorum finibus hiemabat, adoriri parabant, jamque ab eo non longius bidui via aberant quum duas venisse legiones missu Caesaris cognoscunt. Itaque positis castris Germanorum adventum exspectare constituunt.

END OF FIRST YEAR.

Music.

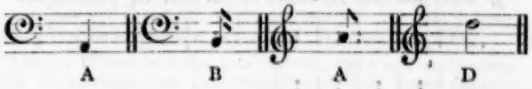
STAFF NOTATION.

(*A Quarter of an Hour allowed for this Paper.*)

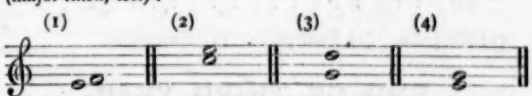
[N.B.—Pupil Teachers may answer questions in either the Staff Notation or the Tonic Sol-fa, but not both.]

1. Write above each of the following its value-name (crotchet, &c.), and below each its pitch-name (C, D, E, or *Do, Re*, &c.):—

(1) Crotchet. (2) Semiquaver. (3) Quaver. (4) Minim.

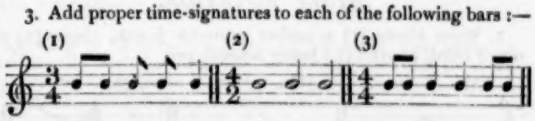


2. Write below each of the following intervals its name (major third, &c.):—



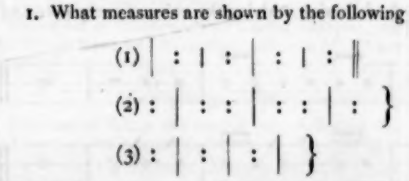
Minor Second. Major Third. Perfect Fifth. Minor Third.

3. Add proper time-signatures to each of the following bars:—



TONIC SOL-FA NOTATION.

1. What measures are shown by the following pulse-signs?



(1) Four-pulse. (2) Three-pulse. (3) Two-pulse.

2. Write the names of the following intervals :—(1) *me* to *fah*, (2) *soh* to *te*, (3) *fah* to *doh'*, (4) *lah*, to *doh*.

(1) Minor second, (2) major third, (3) perfect fifth, (4) minor third.

3. Write the following an octave higher, doubling the value of each note :—

| m : — | — : d | s, : — |

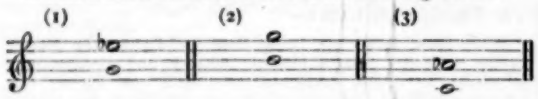
| m' : — | — : — | — : — | d' : — | s : — | — : — ‖

END OF SECOND YEAR.

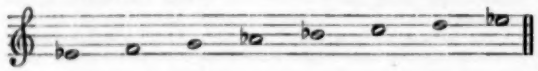
STAFF NOTATION.

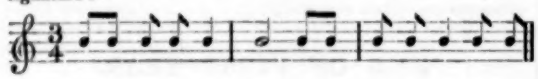
1. Add a minor sixth above each of the following notes :—

(1) (2) (3)



2. Write the scale of E♭, placing the necessary flats before the notes to be flattened.



3. Add bars to the following, in accordance with the time signature :—

TONIC SOL-FA NOTATION.

1. Which tones of the common major scale have minor seconds above them?

Me and *te*.

2. What is the mental effect of (1) *lah*, of (2) *te*, of (3) *soh*?

(1) Sad or weeping, (2) piercing or sensitive, (3) grand or bright.

3. What measures are shown by the following pulse-signs?

(1) | : : | : : | : : | : : }

(2) | : | : | : | : ‖

(3) | : : | : : | : : | : : | : : | : : }

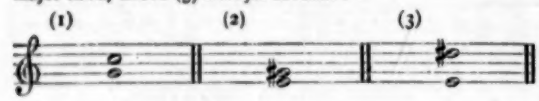
(1) Six-pulse. (2) Four-pulse. (3) Nine-pulse.

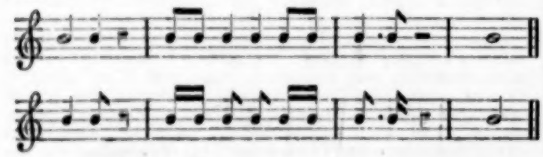
END OF THIRD YEAR.

STAFF NOTATION.

1. Write above (1) a perfect or major fourth, above (2) a major third, above (3) a major seventh :—

(1) (2) (3)



2. Re-write the following, halving the value of every note and rest :—

3. State (briefly) the meanings of the following terms :—(1) Crescendo, (2) Ad libitum, (3) Forte, (4) Allegro.

(1) Increasing (in loudness), (2) according to taste, (3) loud (4) cheerful.

TONIC SOL-FA NOTATION.

1. Write the minor sixth above each of the following notes :—(1) above *fah*, (2) above *lah*, (3) above *ray*.

(1) *Ra*[1], (2) *fah*[1] (3) *ta*.

2. Re-write the following, doubling the value of each note and rest :—

| s .,l : s . | : d' | - .s : m ‖

| s :-.l | s : | : | d' : — | — : s | m : — ‖

3. State (briefly) the meanings of the following terms :—(1) Crescendo, (2) Ad libitum, (3) Forte, (4) Allegro.

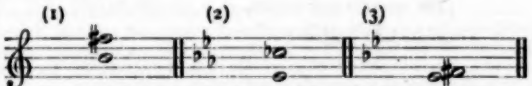
(1) Increasing in loudness, (2) according to taste, (3) loud, (4) cheerful.

END OF FOURTH YEAR.

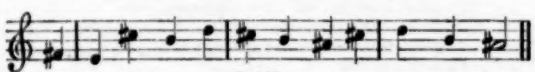
STAFF NOTATION.

1. Write below each of the following intervals its name (major second, &c.) :—

(1) (2) (3)

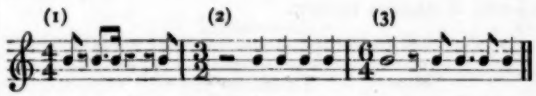


Perfect fifth. Minor Sixth. Augmented Second.

2. In what minor key is the following passage?

B Minor.

3. Complete each of the following bars by adding one note at the end :—

(1) (2) (3)



TONIC SOL-FA NOTATION.

1. Write the names of the following intervals :—(1) *te* to *fe*[1], (2) *lah*, to *fe*, (3) *fah* to *se*.

(1) Perfect fifth, (2) major sixth, (3) augmented second.

2. In the minor or *Lah* mode, (1) what is the major or essential seventh, and (2) what is the minor or essential sixth?

(1) *Se*, (2) *fah*.

3. Write (in figures) over each note and rest of the following passage its value in pulses or fractions of a pulse :—

| .s : d' .,s : m | s .- .f : m .r : d . ‖

½ ½ ¾ ¼ 1 ¾ ½ ½ ¼ ½ ½

| .s : d' .,s : m | s .- .f : m .r : d . ‖

Our Certificate Class.

BY DR. GEORGE BEACH.

Head Master of Christ Church School, Macclesfield.

DICTATION.

The passage to be written will consist of about 150 words from some standard author, will not present any extraordinary difficulties, and will be dictated by the examiner in phrases, about four or five words at a time.

Generally, it is given out but once, but some examiners, if the room be large, are considerate enough to dictate it from one end of the room, whilst an official at the other end immediately repeats each phrase.

As 'plenty of room for the passage is allowed, words must not be divided between two lines. Any omissions or erasures will be counted as mistakes.' Be careful to write well, and punctuate rationally.

PARAPHRASING.

Very great importance seems to be attached by the Department to this exercise, as from 1882 to 1886 it occupied the field to the absolute exclusion of Grammar and Analysis, both in the Male and Female papers.

For the last six years the ladies have been required to paraphrase one out of two given passages; but to the sterner sex a choice, and that more restricted, has been allowed only in 1882, 1886 and 1887.

About forty minutes should be spent on this test.

The general result of paraphrasing is disappointing and necessarily so. Although 'mine own it is a poor thing.' Given that the selected passage is choice English, written by a standard author, perhaps in poetic diction—how can an ordinary mortal, condemned to express another's ideas, fettered to commonplace prose, and with a conventional vocabulary (the author having selfishly chosen the best expressions) be satisfied with his flat and feeble imitation?

The 'great one' has appropriated the highest seat: the humble copyist must needs occupy a lower one.

The test is a cruel one, Shakespere versus Mary Jones, or Milton versus John Smith; neither do we think that these illustrious poets took any thought for the embarrassing woes of a paraphrasing posterity.

Yet we venture to think the exercise a most valuable one. Although nothing in education can fully supply the lack of a second language, nevertheless paraphrasing is not a bad substitute for translation, especially if it be combined with grammatical analysis.

Every translator is compelled to analyse and paraphrase, and this latter and efficient means of educational development is simply utilised, by a herein wise Department compelling translation of English into English.

As diverse as men's minds are the different methods employed. I. There is the rough-and-ready method, which writes down at once the general sense of the extract. II. There is the dogged or prosaic method which consists of paraphrasing word by word, and sentence by sentence, through sheer force of dictionary and synonyms. This *modus operandi* cannot be recommended. It is responsible for converting 'God moves in a mysterious way, His wonders to perform,' into 'The Lord goes about in a stealthy manner doing astonishing things.' III. There is the cunning method (child of the prosaic), which taking a view of the whole passage, by inverting sentences, substituting the active for the passive voice, &c., using the general for the particular, the concrete for the abstract, craftily, if mechanically, disguises how little has been really effected. IV. Best of all is the artistic method, which is as difficult of description as of employment, and which actually demands a high order of mind for its execution. It consists in appreciating, and reproducing under another guise, the spirit of the excerpt, bringing into the foreground all the essentials in their proper order and prominence, and judiciously subordinating the mere details. It deals with ideas more than words.

Generally, this method is not so successful as 'the cunning one;' nor as a rule is there sufficient time for its employment. In truth, the average examiner will mistake the crafty for the artistic. Nature only brings forth a few Matthew Arnolds.

Therefore, as accessible to all, and yet the most paying, we recommend and give an instance of the third method.

Original passage.

(*a*) Under the circumstances (*b*) the prosperity (*c*) of the Italian states (*d*) depended (*e*) far more (*f*) on the ability (*g*) of their foreign (*h*) agents, (*i*) than on the conduct (*j*) of those who were entrusted with the (*k*) domestic administration.

(*l*) The ambassador (*m*) had to discharge (*n*) functions (*o*) far more delicate (*p*) than transmitting orders of knighthood, (*q*) introducing tourists, (*r*) or presenting (*s*) his brethren (*t*) with the homage (*u*) of his high consideration.

(*v*) He was an advocate (*w*) to whose management (*x*) the dearests interests (*y*) of his clients (*z*) were entrusted—(1) a spy (2) clothed (3) with an inviolable character.

Paraphrase.

(*a*) These facts being so, (*b*) the welfare (*c*) of the Italian communities (*d*) was sustained (*e*) in a much less degree (*i*) by the policy (*j*) of the executive (*k*) at home (*f*) than by the tact (*g*) of their representatives (*h*) abroad.

(*l*) Upon these envoys (*m*) devolved (*n*) duties (*o*) requiring much more subtle talent (*p*) than [merely] carrying complimentary distinctions, (*q*) securing social consideration for their compatriots, (*r*) or assuring (*t*) with formal humility (*s*) their fellow diplomates (*u*) of their profound regard.

(*v*) They were [really] confidential agents (*w*) upon whose skill (*x*) the most important concerns (*y*) of their principals (*z*) depended— [mere] (1) emissaries (2) invested (3) with a sacred and privileged immunity.

Note *A* synonyms, *e.g.* (*b*), (*c*), (*g*), (*h*), (*k*), (*l*), (*m*), (*n*), (*o*), (2).

B inversion of sentence at (*f*), (*g*), (*k*), (*l*).

C abandonment of periphrasis, or circumlocution (*j*).

D substitution of plural for singular (*l*), passive for active (*d*), active for passive (*z*), general for typical particulars (*p*), (*q*), (*r*).

E expansion of idea (3), and strengthening words [really], [mere].

F change of figure (*e*), (*v*), (*w*), (*x*), (*y*), (*z*).

See also the examples of paraphrasing in our March issue, and in various numbers of last year's 'Practical Teacher.'

Messrs. W. and R. Chambers publish, price 4d., an excellent little book, 'Rules for Paraphrasing,' by Rev. Canon Morris, late Principal of Carmarthen Training College.

As to which is most difficult of paraphrasing, poetry or prose, opinions differ. 'Much may be said on both sides.' The mechanical difficulty in the former is not so great; for your prose vocabulary is sometimes left comparatively unmonopolised, and it is easy to vary the construction.

On the other hand the result is more 'bathetic,' and the poetical figures and ideas are more difficult of conversion into those admissible in prose.

Analysis of Sentences.—There are in vogue two kinds of analysis, the verbal or extended, and the tabular. Of these we believe the Department rather incline to the latter, for questions have been set as follows:—'Analyse in TABULAR form, showing *A* the nature of the sentence, *B* its relation (if dependent) to its principal sentence, *C* the subject, *D* the enlargement of subject, *E* the predicate, *F* the enlargement of predicate, *G* the object, *H* the enlargement of object.'

Examples of 'Extended or Verbal analysis' will be found in our March issue and in several numbers of 'Practical Teacher' for 1887.

Example of Tabular Analysis.

Sentence.—'When the enemy was defeated, the general who had been mortally wounded commanded that the pursuit should be vigorously prosecuted. Happily his orders were energetically carried out.'

SENTENCE	KIND OF SENTENCE	SUBJECT		PREDICATE		OBJECT		CONNECTIVES
		SIMPLE	ENLARGED	SIMPLE	ENLARGED	SIMPLE	ENLARGED	
A. When the enemy was defeated, the general... ..... vigorously prosecuted	Principal	general	1 The, 2 who had been mortally wounded	commanded	When the enemy was defeated (time)	(that) the pursuit should be..... prosecuted		when
A 2. who had been mortally wounded	Adjective qual. general	who		had been wounded	mortally (manner)			that
A 3. When the enemy was defeated	Adverb mod. commanded	enemy	the	was defeated				
A 4. that the pursuit should be vigorously prosecuted	Noun sent. gov. by commanded	pursuit	the	should be prosecuted	vigorously (manner)			
B. Happily his orders were energetically carried out.	Principal	orders	his	were carried out	energetically (manner) happily (accompanying circumstance)			

Cautions and directions.—1. Although the verb 'to be' cannot generally by itself constitute a predicate, it may do so exceptionally, when it means 'to exist' or 'to reside,' etc., *e.g.*, 'God is,' 'Addison was at Rome.'

2. Questions must be analysed as if they were direct statements.

3. Beware of placing adverbial accusatives (objectives) in the object, *e.g.*, 'He lived *a year*.'

4. As nominatives-of-address (vocatives) and Interjections are not articulated parts of a sentence, they should be written across the divisions thus: | Adam = Nominative of Address. | Alas! = | Interjection |

5. Examine carefully whether the relative adverbs, alias adverbial conjunctions, etc. (viz., 'where,' 'when,' 'while') introduce adjective instead of adverbial sentences, *e.g.*, 'This is the place *where I was born*' (adjective sentence), *e.g.*, 'He died *where I was born*' (adverbial sentence).

6. Note the use of 'as' (see Cæsar) as a quasi-relative, and take heed of the dative case (indirect object).

Not more than twenty minutes should be devoted to this exercise.

Language, style, and allusions.—Under this head a narrow choice (generally four out of five) has generally been allowed to females, and occasionally to males. This portion of the subject must of course be mastered from the manuals in use. All that we can do is to guide the student by our routines, to test in due time his knowledge by papers of questions, to describe the area traversed by the examiners, and to give some technical hints suggested by study and experience.

Cæsar.—(Many of the remarks respecting this play will, with the necessary and easily made corrections, apply also to 'Comus' and the selected essays).

This play has been previously prescribed for the '72, '78, and '83 examinations.

Questions have been asked respecting the life of Shakespere—his place among authors—his two periods of dramatic writings—position of the play among his writings—the source of his information—dates, etc., of the depicted events—plot, allusions and grammatical peculiarities of the play—the finest portions of the play, and how they illustrate Shakespere's genius (set five times)—its household, peculiar and idiomatic phrases—the derivation of its words, and the force of prefixes and affixes—obsolete words, amplified, narrowed, changed or deteriorated meanings of words—definitions and instances of metaphor, simile, ellipsis, antithesis, metathesis, periphrasis, climax, irony, and pleonasm—the peculiarity of the versification—scanning—tag rhymes and stage directions.

Our examinee will also be required to comment upon given phrases, and to describe, compare or contrast the 'dramatis personæ.' These are important points.

Where possible Shakespere's peculiarities should be illustrated by instances from the Bible, their language being of the same period, *e.g.*, 'his' instead of 'its.'

Comus.—This mask was one of the subjects for the Examinations in '74, '78 and '84. Comus should be compared with Cæsar, as to structure, design, and language. Its moral purport and teaching should be understood—the influence upon it of Milton's scholarship, religious, moral and political opinions noted—its mixture of southern, northern and eastern mythology duly observed. One should also distinguish between what is original, what adapted, and learn to what poets Milton was indebted, and by what poets he has been imitated.

Essays upon Milton and Addison.—An excellent annotated edition of the latter, price 1s., published by Mackie and Co., of Warrington, with Notes, by Rev. M. Stevenson, Principal of Warrington Training College, has been forwarded to us. It is worth procuring in addition to any in the student's possession.

Many of our remarks under 'Cæsar' and 'Comus' will apply, mutatis mutandis, hereto also; and to these, together with the routine hints, we think it unnecessary to add.

ANSWERS TO CORRESPONDENTS.

We shall be pleased to reply briefly, and through this column, to any seeking information or advice.

Answers demanding urgency, will be forwarded per post, on receipt of stamped and addressed envelope.

C. H. (HINCKLEY) and L. R. (SCARBOROUGH).—Male Candidates (Second Year), who have not been examined, or who have failed, or who have not passed satisfactorily in Arithmetic, *must* take Arithmetic *instead of* Mensuration. This change dates from this year.

T. N. (LUTON).—1. See answer above. 2. Our Class is especially intended for Second Year, but we have also included the essential parts of the First Year course.

A.—1. See answer above. 2. You will not require to prepare Cæsar.

REAR-GUARD.—We do not 'coach' by correspondence.

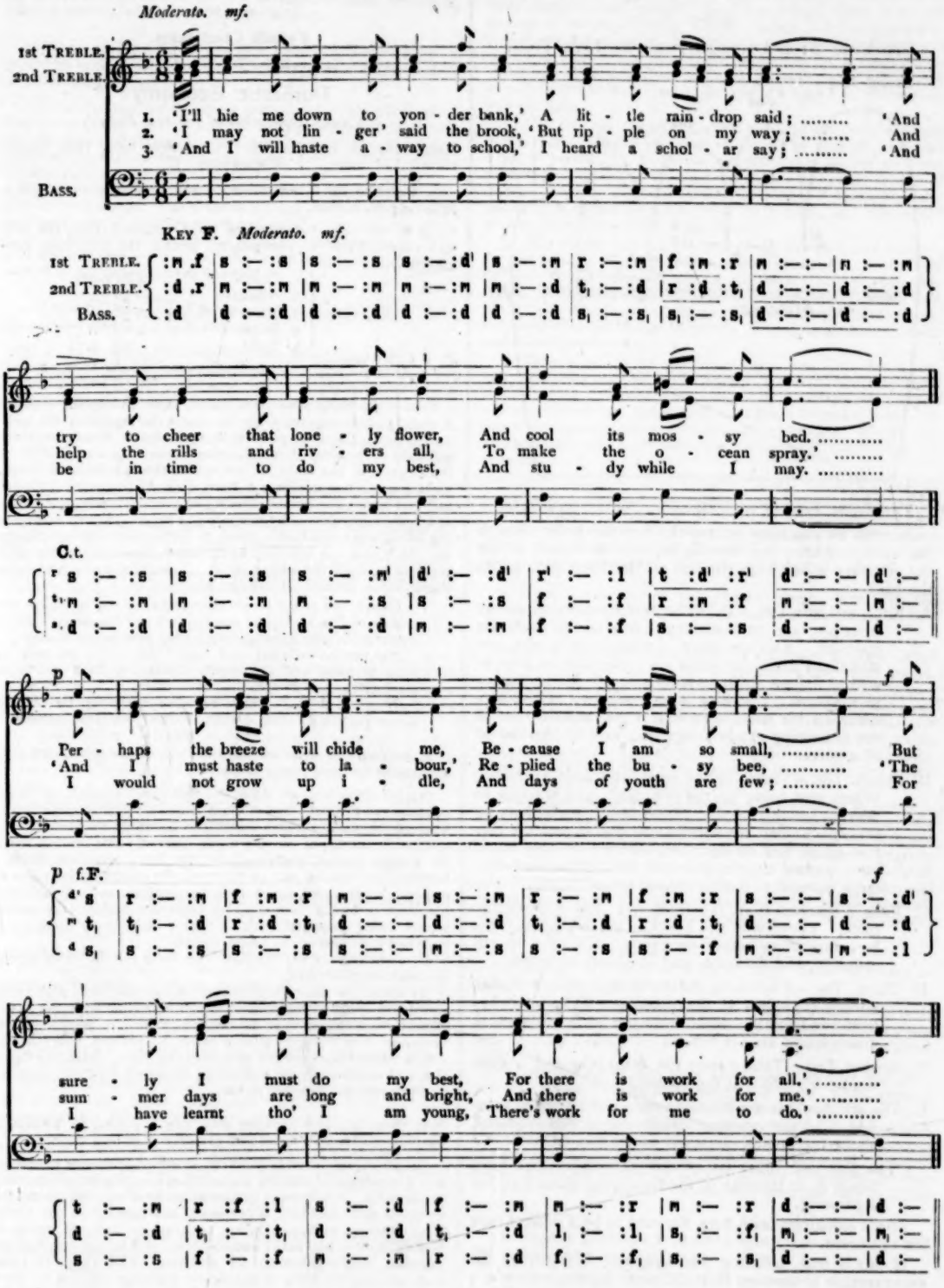
ROUTINE FOR JULY. (MALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	In a Mixed School, how would you distribute the various kinds of study and exercise over 25 or 30 hours per week?	Revise Euclid, Book IV.	Paraphrase Lines 201—222 of Cæsar, Act IV. Scene 3	Deductions 162—176 of Egan, Part II.	Paraphrase Comus, Lines 938—957	Political Map of England	Persons, deities, &c., mentioned in Comus	Map of Australia	History — Eighteenth and Nineteenth chapters of McCarthy	School Management — The lessons to be learnt from the different meanings of 'Habit' and 'Character'	Deductions 192—199 of Egan, Part II.	Study the Syntax of Adverbs and Prepositions
TUESDAY	General Geography of Australia	Arithmetic or Mensuration	Outlines of History, to end of Edward IV. reign	Arithmetic or Algebra	History — Sixteenth and Seventeenth chapters of McCarthy	Notes of Lessons on 'The Races of Man'	Study the Syntax of Adverbs and Prepositions	Algebra — Permutations and Combinations	The Wars of Edward III. and Henry V.	First seventeen Propositions of Euclid, Book VI.	Notes and Text of Comus to the end	School Management. — Dislocations, Fractures, Exercise, pp. 249—259 pp. 276—286 (Carpenter's Hygiene)
WEDNESDAY	Algebra — Permutations	To end of page 47 of Jevon's Logic Primer	Deductions 146—161 of Egan, Part II.	Algebra — Combinations	Definitions of Euclid, Books V. and VI.	Write 30 lines of Composition upon the character of Cassius	Deductions 177—191 of Egan, Part II.	Paraphrase last 13 lines of the Essay on Addison	How has climate affected the descendants of English, Dutch and Spanish colonists?	Political Geography of remainder of Australia	Arithmetic or Algebra	History — Twenty-first chapter of McCarthy
THURSDAY	Write 30 lines of Composition upon 'A friend should bear a friend's infirmities'	Write a Large-hand copy of the word 'Insuperable,' and 30 lines of the Small-hand copy 'Revenge is a kind of wild justice'	Definitions of Euclid, Book V.	Political Geography of New South Wales and Victoria	Arithmetic or Algebra	Tables of Yorkist, Lancastrian, and Tudor Dynasties	Arithmetic or Mensuration	History — Nineteenth and Twentieth chapters of McCarthy	Algebra — Permutations and Combinations	Notes of Cæsar to end of Act IV. Scene 3	Arithmetic or Mensuration	Notes of a Lesson on 'Freehand' Drawing
FRIDAY	Notes of Cæsar to end of Act IV. Scene 3	Geography — Winds, and their causes	Arithmetic or Mensuration	Algebra — Combinations	Canon Warburton's Article in our May issue on Pestalozzi	Revise Deductions of Books I. and II.	The flora and fauna of high tropical mountains	First fourteen Propositions of Book VI.	Write 30 lines of Composition contrasting the humour of Addison with that of Swift and Voltaire	The algebraic equivalents of Definitions, Euclid, Book V.	Read the Essay on Addison	Map of Ireland
SATURDAY	Important Dates to end of Henry VI.	Notes of Cæsar to end of Act IV. Scene 3	Algebra — Permutations	Ventilation (To p. 86, Carpenter's Hygiene)	Notes of Comus to line 921	Half-time Registration	First seven Propositions of Book VI.	Arithmetic or Mensuration	Map of Scotland	Arithmetic or Algebra	Outlines of History to end of Henry VIII. reign	Revise Algebra	Arithmetic or Algebra	Important Dates to end of Henry VII.	Revise Algebra	Write out, *for future use*, a Summary of Canon Warburton's last Article on Pestalozzi

ROUTINE FOR JULY. (FEMALES.)

DAY	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
MONDAY	In a Mixed School how would you distribute the various kinds of study & exercise over 25 or 30 hours per week?	Analyse, and Parse difficult words of Cæsar, Act IV. Scene 3. Lines 1 to 16	The commerce between the various parts of our Empire	Our Spanish Wars during 18th Century	Revise any Arithmetic	All Geography of Further India and Burmah	What immediate steps should be taken in case of croup, nose-bleeding, dog-bites, scalds, burns and broken bones?	To end of page 47 of Jevon's Logic Primer	Map of Further India and Burmah	Revise any Arithmetic	Geography of South American Possessions	Write 30 lines upon 'Macaulay's position among English writers'
TUESDAY	George III. and his Parliaments. 'The King's Friends.' 'Borough-jobbing'	Exercises in Mental Arithmetic	Paraphrase Lines 201 to 222 of Cæsar, Act IV. Scene 3	Physical Map of Ireland	Describe some investments likely to suit a School-mistress. Stating her income, show how it may be most profitably expended	Needlework — Study pp. 65, 131, 132, 136, 143-145, of Stanley's Needlework Book	Ventilation (To page 86 of Carpenter's Hygiene)	Revise any Arithmetic	Geography of India, Further India or Burmah	Outlines of History from 1760 to 1773	The ordinary and abnormal temperature of the body—How can it be kept or rendered uniform?	Cut out and set on the yoke of a boy's shirt
WEDNESDAY	State the constituents of—Peas, Lean Meat, Bread, Oatmeal, Rice, Cheese and Lard	Notes of Lesson on 'The Races of Man'	Show on sectional paper, representing a square yard, the plan of cutting-out a boy's shirt	Growth of the large towns and development of Industries	Arithmetic — Problems where the difference between Interest and Discount is given	Study the Conjunction, Adjective and Interjection	Prove the statement that 'The sun never sets upon our Empire'	What are the requirements of the 1st Stage of the Specific Subject, 'Domestic Economy?'	Canon Warburton's Article in our May issue on Pestalozzi	What does Macaulay say of Addison's political opinions and life?	Show on sectional paper, representing 36ins. by 18ins., the plan of cutting-out a child's muslin pinafore	Half-Time Registration
THURSDAY	Map of New Zealand	Needlework — Plain	Arithmetic — Any Stocks	School Managmt. — Dislocations. Fractrs., Exercise pp. 249—259, pp. 278—286, (Carpenter's Hygiene)	The impurities of water How can they be discovered and how prevented?	Lives and works of Robertson, Burke, Yonge, Steele and Addison	Analyse, and Parse difficult words of Cæsar, Act IV. Scene 3, lines 18 to 32	Voyages of Anson, Cook and Bligh	Arithmetic — Sharing money in different proportions	What are the strategic possessions of the British Empire?	What mental or physical habits should a School-mistress cultivate or avoid to ward off mental or physical debility?	Arithmetic — To find diameter of circle, circumference being given, or vice versa
FRIDAY	Give list (with cost) of utensils for Cottage Cookery. What sort of stove or range is the best? Why?	Problems similar to Compound Interest, such as 'Pop. increasing 10 per cent. annually'	General History of our West Indian Possessions	Paraphrase Lines 18 to 28 and Lines 65 to 77 of Cæsar Act IV. Scene 3.	Cut out and set on the yoke of woman's night dress	Notes of Lesson on 'Freehand' Drawing	State the facilities affording to 'Saving' or purchasing Annuities, by the Post Office	Write 30 lines of Composition upon 'A friend should bear a friend's infirmities'	Needlework — Plain	School-Management — The lessons to be learnt from the different meanings of 'Habit' and 'Character'	The Quotations, Latin, Greek, or English, in the Essay on Addison	Outlines of History from 1773 to 1783
SATURDAY	Master the 'allusions' in the 2nd half of 'Addison'	History — Place Bill 1742. Pitt's Finance. Growth of National Debt	Physical Features of Further India and Burmah	Write a Large hand copy of the word 'Insuperable' and 30 lines of the Small hand copy 'Revenge is a kind of wild justice'	Net Income from Stock Operations, allowing for Commission and Income Tax, etc.	Notes of Cæsar to end of Act IV. Scene 3	How would you prevent the spread of fevers, small-pox and cholera?	Practise Flannel Patching	Square Root and Compound Proportion	Notes of Cæsar to end of Act IV. Scene 3	Show on sectional paper, representing 54ins. by 36ins. the plan of cutting-out a woman's night-dress	Battles of Quiberon Bay 1759, Cape St. Vincent 1780 and 1797, Rodney's Victory 1782	Study the Conjunction, Adjective and Interjection	Geography of West African Possessions	Explain the method of proving multiplication by 'casting out the nines'	Write out (for future use) a Summary of Canon Warburton's last article on Pestalozzi

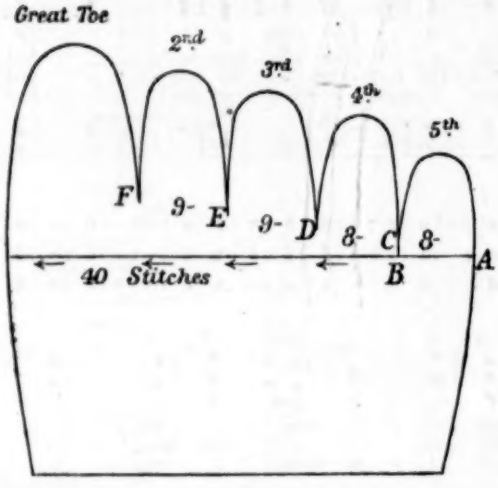
WORK FOR ALL.


Moderato. mf.
1st TREBLE.
2nd TREBLE.
BASS.
1. 'I'll hie me down to yon - der bank,' A lit - tle rain - drop said; ..... 'And
2. 'I may not lin - ger' said the brook, 'But rip - ple on my way; ..... And
3. 'And I will haste a - way to school,' I heard a schol - ar say; ..... 'And
KEY F. Moderato. mf.
try to cheer that lone - ly flower, And cool its mos - sy bed. .....
help the rills and riv - ers all, To make the o - cean spray.' .....
be in time to do my best, And stu - dy while I may. .....
C.t.
p
Per - haps the breeze will chide me, Be - cause I am so small, ... But
'And I must haste to la - bour,' Re - plied the bu - sy bee, ... 'The
I would not grow up i - dle, And days of youth are few; ..... For
f
p f.F.
f
sure - ly I must do my best, For there is work for all.' .....
sum - mer days are long and bright, And there is work for me.' .....
I have learnt tho' I am young, There's work for me to do.' .....

Knitting Maps.

BY MRS. J. D. HARRIS.

STOCKING WITH DIVISION FOR THE FIVE TOES.



The Right Foot of a Gentleman's Sock. 80 *stitches.*

As soon as you have knitted the foot the proper length (as far as to where you usually begin to decrease) divide the stocking in half. 40 stitches on the front pin, 40 on the back.

A. Fifth, or Little Toe.—Take the *first* 8 stitches from the front pin, and on another pin 8 from the back pin opposite. Arrange these 16 stitches on 3 pins, and knit them round for about an inch; but as toes as well as fingers differ in length it will be necessary to measure. Decrease 4 or 5 stitches at the top, break off the wool, and with a rug needle run all the remaining stitches together, exactly like the tip of a glove.

B. Fourth Toe.—Fasten in the wool, and knit all round. When you come to the toe pick up 4 stitches to prevent leaving a hole. (Some people prefer leaving this space open for ventilation, but if you do this you must cast on as many stitches as you would have picked up, or you will not make your toes large enough.) Knit a second row all round.

C. Take 8 stitches from the front pin, and 8 from the back. These, with the 4 picked up, or cast on, must be arranged as before on 3 pins. Knit the length required, and decrease, and finish off as before.

D. Third Toe.—Fasten in the wool and knit 1 round, adding 4 stitches at the opening. Take 9 stitches from the front pin, and 9 from the back. Add the 4, arrange and knit as before.

E. Second Toe.—Take 9 from the front pin, and 9 from the back; add 5 at the opening.

F. The stitches that are left form the great toe. You must add 6 at the opening. Knit the length required, about 1¼ inches, decrease, and fasten off.

The left foot must be exactly reversed. You must begin A. at the *end* of the front pin, instead of the *beginning*.

These stockings, with toes, are said to be a perfect cure for soft corns.

If this is true, suffering humanity will not grudge the extra trouble in knitting this elaborate pattern, which is a decided contrast to the very elementary pattern published last month.

Model Answers to Certificate Questions, Christmas, 1887.

Female Candidates.

FIRST YEAR.

Domestic Economy.

THREE *hours allowed for this Paper.*

Candidates are not permitted to answer more than EIGHT questions.

1. Describe the constituents of milk, and explain why it is called a perfect food.

(1) If we take 100 parts of milk obtained from the cow and submit them to analysis we obtain the following constituents:—

(A) Solids	1. Casein ...	...	4·83 parts
	2. Albumen	...	·58 ,,
	3. Fat ...	...	4·30 ,,
	4. Sugar ...	...	4·03 ,,
	5. Salts ...	...	·55 ,,
(B) Water	... ...	...	85·71 ,,
			100·00 parts

FOODS are those substances which, after undergoing changes in the digestive organs, serve to renew the organs of the body and to keep them in good working order. Some foods are valuable as formers of *tissue*,—these renew the composition of the organs of the body; others again, through their oxidation, yield warmth and motion; a third class of necessary foods are salt and water, the former entering into the composition of tissue, and both being absolutely necessary to healthy digestion, and to the interchange constantly going on between the various tissues and the blood. A reference to the table above shows that milk contains in itself the entire series of essential foods, and is, in consequence, termed a PERFECT FOOD.

Casein and *albumen* are nitrogenous foods, by which the tissues of the body are constructed and repaired. Their oxidation is also accompanied by the production of heat.

Fat (hydro-carbons) and *Sugar* (amyloids) are seen to exist in milk, and are chiefly valuable as heat and force producers.

Water and *Salt*, which together make up by far the larger portion of milk, assist interchange and digestion.

2. Explain the structure and function of the teeth, and give some rules for their preservation.

(2) (*a*) *Structure of Teeth.*—Teeth are formed of three substances—*dentine*, *cement*, and *enamel*. The dentine is the bone-like substance which forms the inside of the tooth. It is covered in the upper part by a hard enamel; this enamel forms an almost perfect protection to the bony structure within; beneath the exposed part of the tooth the enamel gives place to cement, a substance softer than the dentine, and which in the elephant is termed ivory. The teeth are hollow, the cavity within being supplied with a pulpy substance abundantly supplied with nerves and blood-vessels.

(*b*) *Functions of the Teeth.*—The teeth are the chief agents in masticating the food.

(*c*) *Rules for their Preservation.*—Clean the teeth with finely powdered chalk or charcoal; too much friction with the brush should be avoided. It is best to wash the mouth out at bed-time, and always after a meal, to prevent the mischief which follows from contact with decaying food. Healthy digestion and sound teeth act and re-act upon one another; exercise and pure air are essential to both.

3. How far, and in what way, can a school be helpful in enabling children to mend and preserve their own clothes?

(3) In every elementary school in which girls are instructed it is a condition of earning a grant that the girls be taught plain needlework. A scheme of graduated series of exercises in needlework for each standard is prepared, and inserted in the Code. This scheme includes ability to hem, to knit, to patch, to sew on buttons and make button-holes, and to cut out and put together simple garments for children. The whole of these exercises may be made available for enabling children to mend and preserve their own clothes. Further, the discipline of the school should be such that a desire should be manifested by

each child to maintain a neat appearance. Careful preservation of their own attire, and that of their schoolfellows, should be enforced as a duty, especially as the parents of scholars attending the elementary school are not in circumstances permitting frequent renewal of their children's clothing.

4. What are the different purposes served by food? Name in regard to each of those purposes some one kind of food which is particularly valuable.

(4) Food is required to supply materials for the growth of all the tissues of the body, so that the body may attain full growth, and the waste which daily occurs may be repaired. Food also keeps up the natural heat of the body, and supplies the force necessary for movement and work.

In connection with the first-mentioned purpose of food *meat* may be mentioned. The flesh of animals is one of the main sources of our nitrogenous food, and by this the tissues of the body are mainly constructed and repaired. *Butter* is an example of a non-nitrogenous food, which, by its large per centage proportion of carbon, produces warmth.

5. Explain the nature of the injuries caused by (1) high heels, (2) pointed shoes, (3) tight lacing.

(5) 1. *High-heeled Boots* are injurious, inasmuch as they throw the weight of the body on the front of the foot, and thus the balance of the body is disturbed, so as to throw more strain upon the spinal muscles. Spinal curvature may follow.

2. *Pointed Shoes* leave no room for the movement of the toes during walking, hence these become cramped and deformed; further, the circulation of the blood is impeded, with cold feet and chilblains as a result.

3. *Tight-lacing* exercises an injurious effect upon respiration, the action of the diaphram and the ribs in expanding and contracting the chest being impeded; indigestion also ensues on account of the compression upon the liver and stomach; circulation is obstructed, and this is followed by a blotched appearance of the nose; the figure is deformed at the waist and a tendency to high clavicle structure is induced.

6. How would you remove (1) ink stains, (2) fruit stains, (3) grease stains, and (4) paint from clothing?

(6) 1. *Ink stains* should never be put into soapy or soda water, as they directly become iron-moulds. They should be instantly wetted with cold water, and at once removed by the application of lemon-juice or salt of lemon.

2. *Fruit stains* yield to bleaching powder, especially if after it is put on the powder is moistened by acid, such as vinegar or lemon. Care must be taken not to use an acid upon coloured things.

3. *Grease stains.*—Ox gall is used in the system to dissolve the fats. In the laundry it is used to remove grease from clothing.

4. *Paint.*—Apply turpentine before the paint sets hard.

7. Why is it needful that bed-rooms should be ventilated, and how may this object best be effected?

(7) Impurities are conveyed into the air by the process of breathing and also by the action of the skin. During the day in the ordinary dwelling rooms, doors and windows may be opened and closed at will, but at night the occupants of a bedroom remain for many hours unconscious, and unless means are adopted for the automatic change of air in the bed-rooms, this air may become very injurious. Open windows not only yield draughts, but are objected to on the ground of not being safe.

The ventilation of a bed-room may be effected by means of (1) an open chimney, especially if an opening be made into it near the ceiling. (2) a perforated ventilator over the door communicating with a well ventilated corridor or staircase. (3) A block of wood may be inserted at the bottom of the window-sash, and the window pulled down on this, thus allowing air to be admitted between the two sashes by an upward current. (4) By the use of valves, such as Boyle's and Dr. Arnott's.

8. Give a few simple counsels suited to a pupil teacher on one of these subjects :—

Diet.
Sleep.
Economy of strength.

And add reasons in each case for the advice you give.

(8) DIET.

1. *Necessity of Diet.*—It is found by experience that unless food is regulated in kind and in amount, healthy conditions of body cannot be maintained. Each day brings about a certain amount of waste, which by careful analysis can be determined. It is found, for example, that an adult man loses 4·300 grains of carbon and 200 grains of nitrogen per day on the average; it is, therefore, necessary that the food he eats during the same period should at least contain the above amounts of both carbon and nitrogen.

2. *The Diet must be mixed.*—The requisite amount of nitrogen and carbon is yielded by a diet consisting of $\frac{3}{4}$lbs of meat and 2 lbs. of bread. If, however, we attempted to live on meat alone $2\frac{3}{4}$ lbs. would be required before the necessary supply of carbon would be secured; on the other hand, if bread alone be taken, then $3\frac{1}{2}$ lbs. of bread would be needed, and this would give an excessive amount of carbon.

3. *Diet should vary with changes of Temperature and Work.*—In cold weather a larger amount of fatty substances are required to maintain the temperature of the body; hence more fats should be eaten in winter than in summer. Again, during hard work the losses are almost double those experienced during rest; it follows that an increased supply of food is necessary during periods of great activity.

4. *There should be three meals per day, and each should contain the foods necessary for healthy life.*—An ordinary meal is fully digested in about four hours. If, therefore, we arrange our meals with an interval of five hours between each, the digestive organs obtain regular periods of repose. Where only two meals are taken per day there is danger of overloading the stomach.

5. *Meals should be taken at regular times, and each should be succeeded by a period of rest.*—The reason for this advice is this, that the digestive organs fit themselves by regularly recurring practice to the work they have to perform. If immediately after a meal violent exercise be taken the blood is withdrawn from the digestive organs, and their work is thus impaired.

9. What are arrowroot and Indian corn? What are the special qualities which fit them to be used as food, and how may they best be prepared for use?

(9) *Arrowroot* is obtained from the tubers of a plant called Maranta Arundinacea. It is cultivated in the West Indies, South America, Ceylon, and other tropical countries. It contains 72 per cent. of starch, and whilst it is not highly nutritious it is easily digested. It is thus frequently given to invalids with advantage. It is prepared by mixing an ounce with cold water, and pouring on it a pint-and-a-half of thoroughly boiling milk, stirring it the whole time; the heat used must render the arrowroot and milk into a transparent jelly.

Indian Corn is grown and used to a great extent in America. It is deficient in gluten, but contains a large proportion of fatty matter. Indian corn bread requires the meal to be scalded, and when cool add yeast and salt. After *rising* for about an hour wheat flour is added to about an equal amount; the dough remains for a couple of hours before it is placed in the oven and baked into bread. Indian corn may also be boiled like oatmeal, and be eaten hot with milk or butter. With eggs it forms a nutritious pudding.

10. Explain the use of eggs in cooking. How may they be best preserved for later use?

(10) Eggs are generally beaten or whipped before being used in cooking; in this way air particles are introduced into the egg and by their agency the substance when cooking is rendered light.

To preserve eggs they must be covered so that the fluid material does not evaporate through the shell. Eggs greased all over with lard or plunged into bran will keep longer than when exposed freely to the air. Eggs should be packed with their large end uppermost in order to prevent the yolk approaching and sometimes sticking to the sides of the shell. Another plan adopted for preserving eggs is to mix freshly slaked lime in water to the thickness of cream, and cover the eggs with the mixture.

11. Explain fully how to lay and light (1) an open fire, and (2) a close stove.

(11) 1. *An Open Fire.*—It is first necessary to clean out completely the grate, reserving the cinders for immediate use. When the grate is thus prepared a few pieces of coal or cinder should be loosely placed in the bottom; over these place several pieces

of folded paper, and then arrange over the paper several thin pieces of stick or wood, the upper layer crossing those below so as to allow a ready draught between each; lastly, cover lightly with small selected pieces of coal and the remainder of the cinders. The fire is now ready for lighting.

2. *A Close Stove* requires different treatment. Fresh air cannot enter through the bars in front, as is the case in the open fire, but only through the bottom of the grate. This portion of stove must be left clear in order to induce as much draught as is required; hence do not place a thick layer of coal and cinder in the bottom of a close stove before lighting.

END OF SECOND YEAR.

Female Candidates.

FIRST PAPER.

Domestic Economy.

THREE *hours allowed for this paper.*

No Candidate is allowed to answer more than EIGHT questions.

1. Describe fully the process of making bread.

(1) (*a*) *Materials.*—If a quartern loaf is to be made the following materials will be required:—3½ lbs. of flour, one teaspoonful of salt, 1½ pints of lukewarm water, and 1 oz. of German yeast.

(*b*) *Process of making.*—1. Powder the yeast in a basin, and mix with some of the lukewarm water.

2. Place 2¾ lbs. of flour with salt into the bread-making bowl.

3. Into a hole in the flour pour the yeast and some of the lukewarm water; sprinkle flour over the yeast mixture, and when this begins to crack the whole may be kneaded together. This is done by adding more water, and gradually working the flour into a very thick paste.

4. Cover the bowl with a cloth and place near a fire for two hours.

5. When risen place the ¾ lb. of flour not used on the kneading board, and turn the dough out upon it; knead the dough thoroughly with the dry flour, and when it feels quite elastic place the dough in a well-floured tin.

6. Stand the tin for about 15 minutes in a warm place, prick the top with a fork and place in a hot oven for about two hours, allowing the oven gradually to go down during the last hour.

2. Give recipes for making (1) beef-tea; (2) mutton-broth; and (3) pea-soup.

(2) 1. *Beef-tea.*—Take one pound of gravy beef; cut up very small, taking care to remove skin and fat; then place in a stone jar with half a pint of water; put a lid over the jar. *Stand the jar in a saucepan of boiling water* for three hours; pour the beef-tea into a cup and use salt according to taste.

2. *Mutton-broth.*—Take 3 lbs. of the scragg end of the neck of mutton, 2 oz. of pearl barley, teaspoonful of salt, a turnip, an onion, a carrot, two leeks, and a teaspoonful of chopped parsley. Cut the mutton into small portions and add three quarts of cold water and the salt; simmer for one-and-a-half hours, and skim off all the fat that may rise to the top. Now add the vegetables and the barley and simmer for another half hour; just before serving add the parsley.

3. *Pea-soup.*—Take a quart of split peas, two onions, one turnip, a carrot, a head of celery, a teaspoonful of salt, a half-tea-spoonful of pepper, and some cooked or raw bones. Soak the peas for twelve hours and place in a saucepan with two quarts of cold water. When boiling put in the vegetables, adding bones, salt, and pepper; boil for two hours, stirring occasionally. Take out the bones and pass the soup through a colander. Serve with toast cut into small cubes.

3. Give some simple rules for the management of a School Savings Bank. Should it be permissible to use the bank for the savings of the parents? If not, why not?

(3) *Simple Rules.*—1. The head teacher, who is styled treasurer, should himself receive all monies and sign the bank books.

2. Posting of accounts might with advantage be done by a responsible assistant. This affords a safe check.

3. Encourage especially the children in the Upper Standards to invest. Money transactions are not safe in the hands of very young children.

4. Have a fixed time in each week for the reception and withdrawal of money, and make it so as not seriously to interfere with the playtime of the children.

5. In consequence of interest beginning as soon as the aggregate investment reaches £1, the scholars might receive interest when the saving of each reaches 10s.

It would be inconvenient for the School Savings Bank to be used by the parents, because of the increased labour thrown on the school staff, especially as the Post Office authorities are willing to receive small amounts.

The training in the exercise and habit of thrift in the children would be weakened if their own money was mixed up with that of the parent. As a matter of fact, however, it is found very often that the child's bank fund is drawn upon from time to time for the purchase of clothing and domestic expenses, thus showing that parents do make use of the school for household savings.

4. 'High interest,' it has been said, 'is only another name for bad security.' Explain this, and give examples of some forms of investment for savings, which a prudent person should avoid.

(4) The rate of interest includes not only a return for the use of the capital lent, but also a further sum to indemnify the lender for any risk he may run in making the loan. A perfectly safe investment in England commands from 3 to 4 per cent. interest. Any further interest therefore represents the amount of risk accompanying the investment. When the interest is therefore very high, in most cases it may be taken for granted that the risk is considerable.

Mining (Gold and Diamond) are risky investments. A run of good luck may enhance the value of the shares many times, but they are much more likely to be depressed by failure. A prudent person will prefer a moderate rate of interest with absolute safety to one in which his capital may disappear.

5. An invalid is advised to abstain for a while as far as possible from nitrogenous food. What diet is best suited for such a person, and why?

(5) If meat of any kind is allowed the white meats, such as fish and fowl, only should be eaten. These contain only a small amount of nitrogenous matter. Liebig's extract is low in nitrogenous food, as it neither contains albumen nor gelatine. Although not a perfect food, it is extremely stimulating, and increases the appetite for other foods.

Butter and the fat of meat may be prescribed, and in the form of melted butter and bacon may be added to the white meats enumerated above.

Of all cereals rice contains the least amount of nitrogenous material, and may, therefore, be safely eaten. Arrowroot is not so nutritive as rice; it is, however, more free from nitrogenous matter, is almost pure starch, and is easily digested. Of fresh vegetables carrots contain a high per centage of nitrogenous matter, and the potato a low per centage; hence the latter should be preferred.

6. Name the principal disinfectants, and explain in what way to use them.

(6) The following are the chief disinfectants:—

1. *Heat.*—Clothes are placed in a chamber and submitted to a heat of about 260° Fahr. Bedding may be conveniently treated by steaming. The process of boiling acts as a disinfectant, especially if carbolic acid is added to the water. Sometimes it is advisable to burn all infected articles.

2. *Chloride of Lime* is a common disinfectant. If a little vinegar be added it becomes much more potent. In a sick room it is likely to irritate the lungs of the patient. It is most valuable in purifying empty rooms and water-closets.

3. *Carbolic Acid* is a powerful disinfectant. In the liquid state it is most poisonous, and may be mistaken for porter, which it resembles. Sometimes it is mixed with a powder, as in Calvert's carbolic powder, which contains only from 20 to 30 per cent. carbolic acid.

4. *Condy's Fluid*, or *Permanganate of Potash* is useful in disinfecting linen, but owing to its non-volatile character it has no effect on the atmosphere.

5. *Sanitas* is a favourite disinfectant because of its pleasant odour, and because it is non-poisonous, is volatile, and produces no stain.

7. Suppose the managers of an elementary school intend to establish a cooking class; what sort of room and what apparatus would you advise them to procure? Sketch out the first six lessons of a suitable course.

(7) 1. *Room for Cookery Class.*—The room should be one specially fitted with a firm, long table for demonstration and practice lessons, and containing a flue for carrying off the smoke and the fumes from the stoves. If possible, a class-room should be set apart solely for cookery. It would be convenient if during demonstration lessons the children occupied raised platforms or a gallery.

2. *Apparatus:* (1) *A long table*, firm, with white deal top. If fitted with drawers these would be useful for storing knives and spoons, and would at the same time give stability to the table.

(2) *Stoves.*—Gas stoves are most readily fitted, but the fumes soon foul the air, and they are not likely to be used in after life by the children. A small range is far healthier and likely to be of more practical value to the children using it. Gas stoves can be hired at from 2s. to 3s. 6d. per quarter.

(3) *Earthenware and Hardware.*—Stew-pan, various sized saucepans, pudding bowl, and different sized basins, plates, dishes, &c., in all an outfit costing about £6 is required for a class of thirty scholars.

(4) (*a*) Display the apparatus and state the names and uses of the appliances. The oven or gas stove will need most explanation. Make a simple dish such as liver and bacon, or a sausage roll.

(*b*) A demonstration of the above dishes repeated before the class; then allow the class practice in making these for themselves.

(*c*) A demonstration in making a fruit pie, with class practice.

(*d*) A meat pie as above with boiling of potatoes.

(*e*) An Irish stew as above.

(*f*) Rock cakes, marmalade pudding.

8. How would you discover that a child was falling ill with (1) measles; (2) mumps; and (3) scarlatina?

(8) *Measles* commences with a highly feverish attack, the eyes become watery, and there is every appearance of a severe influenza cold. About the fourth day a rash breaks out upon the face and gradually extends downwards in patches over the entire body.

Mumps appear with a high state of fever during the night, and the patient becomes often light-headed. Soon the glands under the lower jaw and ear begin to swell, and for a day or two movement, and even swallowing, is attended with pain.

Scarlatina.—This is another name for a mild attack of scarlet fever. The symptoms are a general feverishness, shivering, and sore throat. The eruption appears earlier than in measles; the spots rapidly run together, and the whole skin assumes a red colour.

9. Why are lime washed walls healthier than those covered with paper, and how is lime washing done?

(9) The wall and ceiling surface of a room should be impervious to moisture, so that the impurities due to breathing and other offensive matter may not soak into it. Paper is the most absorbent coating used for covering the interior of houses, hence it is very unhealthy. Lime-washed walls are far less absorbent and have, further, the advantage of having disinfecting properties to a moderate amount.

In lime-washing obtain first a quantity of unslacked lime, pour into it sufficient water to cover it. The lime will immediately begin to break up, and water must be added to reduce it to the consistency of cream; sometimes, when walls are covered with lime, size is used, in order to prevent the lime rubbing off. In using the lime-wash great care must be taken to keep it the proper thickness. If too thick it will not run smoothly on the wall, and if too thin it will look poor and patchy. Keep the wash the thickness of cream, and then very little splashing need accompany its use.

10. What are the advantages of stewing meat? Say how you would make Irish stew, and give the cost and quantities of the ingredients, supposing that a meal has to be furnished for a father, mother, and three children.

(10) Stewing is a process intermediate between boiling and baking. It possesses the advantage over dry baking that there is no charring nor over-heating of the outside portions; thus, nothing is wasted, and joints too tough or sinewy to be used in any other mode may be stewed with advantage.

Irish Stew.—Take 5 lbs. of potatoes, 1½ lbs. of scrag end of mutton, 1 lb. of onions, and pepper and salt. Cut the meat into small pieces, and put into a saucepan with cold water enough to cover; add half-a-teaspoonful of salt. Let it come to the boil, skim it, and cook gently for an hour. Wash and peel the potatoes, cut them in half, skin the onions and cut them in slices; when the meat has cooked an hour add the vegetables with a sprinkle of pepper and salt, and let all cook slowly with the lid on for another hour. In town the cost would be 1s. 5d.

11. Explain the qualities and uses of (1) borax; (2) soda; (3) ox gall; and (4) chloride of lime.

(11) 1. *Borax* is a substance allied to soda. It is used in the laundry for stiffening linen fronts and collars, and is much preferred to the sole use of starch.

2. The *Soda* bought for domestic use is sodium carbonate. It is an alkaline substance which is soluble in water. It is largely used for cleansing, especially where the water used is hard from the presence of salts of calcium and magnesium.

3. *Ox-gall* is used in the system to dissolve the fats. In the laundry it is used to remove grease from clothing. It is also used in cleaning paintings.

4. *Chloride of Lime*, or bleaching powder, is sometimes used in the laundry. The occasional use for restoring the colour of white clothes may be necessary, but its continued action is injurious to the durability of the fabric. All colours obtained from vegetable dyes and some mineral ones also are destroyed by its application.

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Quarterly Arithmetical Tests.

STANDARD I.—FIRST QUARTER.

1. 7
402
53
6
90

2. 539
412

3. 807
304

4. 9 × 2;
3 × 3;
11 × 4.

SECOND QUARTER.

1. 518
64
9
370
26

2. 153
48

3. 624
570

4. 3 × 10;
4 × 7;
6 × 5.

THIRD QUARTER.

1. 49
608
52
3
871

2. 306
197

3. 814
18

4. 4 × 6;
5 × 12;
6 × 8.

STANDARD II.—FIRST QUARTER.

1. 7,360 + 809 + 52 + 45,096 + 7 + 6,418.
2. From 10,407 take 798.
3. 49,086 × 93.
4. In a porch there were 630 pegs; 487 were occupied by hats, and 59 were broken. How many were empty?

SECOND QUARTER.

1. 67,309 × 508.
2. 42,588 ÷ 6. Write the answer in words.
3. Put down twelve hundred, and subtract 29.
4. 47d.; 63d.; 92d.

THIRD QUARTER.

1. Divide 49,068 by 9, and multiply the quotient by 17.

2. 85,476 × 760.

3. A man takes 3 feet each step; how many steps does he take in walking eight miles, each 5,280 feet?

4. 81d.; 106d.; 134d.

STANDARD III.—FIRST QUARTER.

1. 319,642 ÷ 57.

2. Subtract nine hundred and nine times eight hundred and eighty from a million.

3. Divide eight hundred thousand and eighty by nine hundred and sixty-five.

4. There were 186,200 bricks in a heap. Of these one quarter was removed, and the remainder was carted away in loads of 490. How many loads were there?

SECOND QUARTER.

1. What is the amount of £405 18s. 7½d., £83 0s. 2¾d., £6 14s. 8¼d., 15s. 9½d., 6¼d., and £710 10s. 11d.?

2. How many years are there in five hundred and nine thousand nine hundred and sixty-four weeks, reckoning 52 weeks in a year?

3. From £805 16s. 4¾d. take £795 17s. 8½d.

4. I paid three bills to the amount of £19 8s. 6d. One was £6 10s. 7½d., another £5 19s. What was the amount of the third bill?

THIRD QUARTER.

1. Take seventeen pounds and ten pence farthing from seventy-six guineas.

2. What is the sum of seven thousand and eighteen pounds thirteen shillings and five pence three farthings, one hundred and three pounds eight shillings and nine pence, sixteen thousand five hundred and nine pounds eleven shillings and ten pence halfpenny, three hundred and seventeen pounds six shillings and three pence, fifty pounds nineteen shillings and seven pence farthing, and eighty thousand and six pounds fifteen shillings and eleven pence three farthings?

3. How many books of 476 leaves each can be made from 391 packets of paper, each containing 812 leaves?

4. Thirty books and twenty slates cost one hundred shillings. If each slate cost sixpence, what was the price of each book?

STANDARD IV.—FIRST QUARTER.

1. £73 15s. 10¼d. × 607.

2. Find the ninth part of six thousand three hundred and sixty-two pounds one shilling and three farthings.

3. £19,047 18s. 9½d. ÷ 378.

4. A shopkeeper bought 840 eggs at 8d. per dozen, and sold them at 15 for a shilling. What did he gain or lose?

SECOND QUARTER.

1. Reduce 6,905 guineas 13s. 11½d. to farthings.

2. A grocer bought a chest of tea containing 1¾ cwt. How many quarter-ounce packets could he get out of the chest?

3. Bring one quarter of a million seconds to days.

4. How many yards of calico at 7½d. per yard can I get in exchange for 20 yards of silk at 2s. 9d. per yard?

THIRD QUARTER.

1. Twenty columns of advertisements in a newspaper contain 140 lines in each column, and nine words in each line. What would be the amount for advertisements at the rate of a dozen words for 4d.?

2. Find the value of two fields measuring 2a. 1r. 16p. and 5a. 3r. 20p. at 2s. per square yard.

3. Reduce the earth's circumference (24,890 miles) to inches.

4. If a man earn two guineas a week, and spend 4s. 9d. a day, reckoning seven days per week, how long will it take him to save £8 15s.?

STANDARD V.—FIRST QUARTER.

1. How much change would be received out of a thousand pounds after paying for 489 articles at £1 18s. 10¾d. each?

2. Find the cost of 5 furlongs 181 yards at £186s. 8d. per mile.

3. A bankrupt owes £4,716 10s. and pays 9s. 8½d. in the pound; what is the value of his assets?

4. A brewer had 18 qrs. 7 bus. 2 pks. of malt. He sold half at £4 18s. per qr. and the other half at £4 10s. per qr. Find what he received.

SECOND QUARTER.

1. If 15 men mow 12 acres in one day, how many acres would 25 men mow in 2 days?

2. Make a bill for:—30 lambs at £1 15s. each; 150 eggs at 7d. per dozen; 9 horses at 26 guineas each; 58 ducks at 4s. 9d. a couple.

3. If 6 oxen are worth 30 sheep, and 90 sheep are worth £225, find the value of 14 oxen.

4. From a piece of cloth 100 yards long, 27 yds. 3 qrs. were sold for £14 11s. 4½d.; what would the remainder be sold for at the same rate?

THIRD QUARTER.

1. What must be added to the sum of $\frac{3}{8}$ and $\frac{2}{5}$ to make $\frac{9}{10}$?

2. If $\frac{1}{4}$ of a hayrick cost £28 7s. 6d., what would $\frac{1}{3}$ of it cost?

3. A butcher bought a sheep for £2 10s., and sold it at 8½d. per lb. He lost 6s. 8d. What did the sheep weigh?

4. A man spent $\frac{1}{10}$ of his wages in rent, $\frac{1}{6}$ in clothing, and $\frac{1}{3}$ in food. What fraction of his wages had he left?

STANDARD VI.—FIRST QUARTER.

1. Divide $(\frac{5}{7}$ of $3\frac{1}{8} - \frac{9}{11})$ by $(2\frac{4}{9} - \frac{5}{8})$.

2. Add together 609, 6·09, ·0609, and ·00609, and divide the sum by 60·9.

3. Simplify:— $\dfrac{3\frac{3}{4} - (\frac{5}{6} \times \frac{3}{5})}{2 \div (\frac{2}{7} - \frac{1}{8})}$.

4. Multiply 4·079 by $\cdot\dot{3}$ without reducing both decimals to vulgar fractions.

SECOND QUARTER.

1. Reduce $1\frac{3}{7}$ of $\frac{4}{5}$ of $\frac{5}{6}$ of 1s. 9d. to the decimal of 4s. 2d.

2. If $\cdot1\dot{8}$ of a yard of wire weigh $\cdot1\dot{6}$ lb., what will be the weight of $\frac{3}{4}$ mile of similar wire?

3. In a town of 16,000 electors, ·38 voted for one candidate, ·23 for another, and ·194 for a third; how many did not vote at all?

4. What decimal of £10 is the sum of £3·45, 17·875s., and 10·25d.?

THIRD QUARTER.

1. What is the amount of £406 10s. invested for four months at 3 per cent.?

2. How many yards of carpet ¾ yard wide will cover a room 20 ft. 3 in. long and 17 ft. 8 in. broad?

3. If I borrow £310 from a bank, and pay the money at the end of 219 days, what interest will be due at 3½ per cent. per annum?

4. What sum will amount to £91 9s. in six years at 4 per cent.?

STANDARD VII.—FIRST QUARTER.

1. If 18 men do a piece of work in 15 days working 8 hours a day, how many hours a day must 20 men work to complete it in 12 days?

2. In what time will the interest on £760 amount to £105 10s. at 4½ per cent.?

3. If £650 gain £26 16s. 3d. as interest in nine months, what principal will gain £26 8s. in eight months?

4. After spending $\dot{3}\dot{7}$ + $\dot{4}\dot{1}$ of my money I had £3 11s. 3d. left; how much had I at first?

SECOND QUARTER.

1. The average amount of four bills is £9 16s. 10d.; one bill amounts to £11 13s. 8d., another to £7 15s. 9½d., and another to £8 10s. 6d.; find the amount of the fourth bill.

2. At what rate per cent. will the interest on £267 10s. amount in 3¼ years to £30 8s. 6¾d.?

3. A can reap 3 acres in 5 days, and B can reap 5 acres in 7 days; in what time can A and B together reap 23 acres?

4. I buy half ton of sugar, and sell 40 per cent. of it at 2½d. per lb., and the remainder at 2d. per lb. Find the average price per lb.

THIRD QUARTER.

1. The education rate in a town is 3½d. in the £. Find the rate per cent., and give the answer in a decimal form.

2. What was the prime cost of an article which was sold for 15s. 5d. at a loss of 7½ per cent.?

3. A sold a horse to B at a profit of 10 per cent., and B sold it to C for £42 7s., also making 10 per cent. profit. What did A give for it?

4. The working expenses of a railway company amount to 55 per cent. of the receipts, and the total receipts in one year amount to £600,000; what dividend can be paid on the capital of 6¾ million pounds?

ANSWERS.

STANDARD I.

	First.	Second.	Third.
1.	558.	987.	1,583.
2.	127.	105.	109.
3.	503.	54.	793.
4.	18; 9; 44.	30; 28; 30.	24; 60; 48.

STANDARD II.

	First.	Second.
1.	59,742.	34,192,972.
2.	9,609.	7,098.
3.	5,494,998.	1,171.
4.	84 pegs.	3s. 11d.; 5s. 3d.; 7s. 8d.

THIRD.

1.	92,684.	3.	14,080 steps.
2.	64,961,760.	4.	6s. 9d.; 8s. 10d,; 11s. 2d.

STANDARD III.

	First.	Second.	Third.
1.	5,607 + 43.	£1,207 0s. 9½d.	£62 15s. 1¾d.
2.	200,080.	9,807 years.	£104,006 15s. 11¼d.
3.	829 + 95.	£9 18s. 8½d.	667 books.
4.	285 loads.	£6 18s. 10½d.	3s.

STANDARD IV.

	First.	Second.
1.	£44,792 3s. 5¾d.	6,960,910 q.
2.	£706 17s. 10½d.	12,544 qr.-oz.
3.	£50 7s. 9¾d. + 272.	2 days 21 hrs. 26 m. 40 sec.
4.	9s. 4d. gain.	88 yards.

THIRD.

1.	£35.	3.	1,577,030,400 in.
2.	£3,980 18s.	4.	20 weeks.

STANDARD V.—FIRST.

1.	£48 19s. 11¼d.	3.	£2,289 9s. 4¼d.
2.	£13 6s. 10½d.	4.	£89 0s. 1½d.

SECOND.

1. 40 acres.
2. £52 10s. + 7s. 3½d. + £245 14s. + £6 17s. 9d. = £305 9s. 0½d.
3. £175.
4. £37 18s. 7½d.

THIRD.

1.	⅛.	3.	80 lbs.
2.	£18 18s. 4d.	4.	⅞.

STANDARD VI.

	First.	Second.	Third.
1.	$\frac{40}{171}$.	·2.	£410 11s. 3⅜d.
2.	10·1011.	10 cwt. 90 lbs.	53 yards.
3.	$\frac{88}{101}$.	3,136.	£7 19s. 7⅛d.
4.	1·3596.	·43864583.	£73 15s.

STANDARD VII.

	First.	Second.	Third.
1.	9 hours.	£11 7s. 4½d.	1·458⅓ per cent.
2.	2½ years.	3½ per cent.	16s. 8d.
3.	£720.	17½ days.	£35.
4.	£16 17s. 6d.	2½d.	4 per cent.

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Practical Needlework in Elementary Schools.

BY MISS J. W. WARREN,

Inspectress of Needlework to the Leicester School Board.

WHEN children have passed through the babies' room little with regard to threading needles remains to be taught, but great care is needed to ensure suitable needle and thread. The string and baby threader may now give place to a No. 6 needle, and thread No. 36. The thread should be fresh each lesson, and as good as can be bought, common is apt to untwist,

causing children much trouble, and giving rise to irritation. When you have fitted the class proceed with ordinary needle threading drill, No. 4, Sheet II. Continue this for about ten minutes, then repeat, for another ten, the thimble drill in Sheet I. When these can be done quickly and accurately, it is time to begin something a little in advance, and we should then proceed to teach what I call, for lack of a better name, combined thimble and needle drill. See Sheet II., Drill V.

This exercise is to teach the right holding of needle with right use of thimble. No time will be wasted in getting this perfect, as it has been proved beyond dispute that only by a right use of these two implements can a child be taught to become a good needlewoman.

Have your needles threaded, your thimbles ready to put on. A little piece of felt for each child to keep his needle stuck into. Explain by illustration that the first finger and thumb *hold* the needle while the *movement* is effected by the thimble finger. Now direct children to pick up the needle with the left hand, holding it midway between point and eye, point to left, eye to the right. This, done with finger and thumb, can be set right in very little time, and should be repeated until quite uniform throughout the class. Now for the combination, bring the eye of needle in contact with thimble, not quite at the top, but very near, and at the side nearest to the fore finger. (The great effort made to work on the top of thimble is useless, and almost impossible of attainment with young beginners.) Now let the needle be grasped in right hand by finger and thumb just below eye, not losing hold with thimble. We will imagine that the needle is now securely held with both hands as above. There remains to adjust the cotton: this to be raised with left hand, placed over the back of hand between the thimble and next finger, and when all these things are right the position of the arm must receive attention; you will find the elbow out, have it put close in to the side, hand pointing needle to the left, but not directly over shoulder, wrist curved in to body a little; with care in these things you will have taught the Combination Drill V., Sheet II. Note.—Some teachers have this done before the needle is threaded, but this is not so good, I think, for the cotton has to be dealt with in the end, and is rather an aid than a hindrance to the holding, besides helping the teacher to see the needle's eye quite at once, besides, the needle is not lost so easily.

It will be noticed that the five drills explained have had more direct bearing upon the right hand than the left. We must now turn our attention to the work to be done, rather than the instruments of work. In other words, we will analyse the holding of material in the left hand.

Provide strips of unbleached calico about twopence or threepence a yard. Let the strips be cut selvage way nine inches long, two broad, have a hem neatly fixed about one third of inch wide. As these strips will serve for several lessons, care should be taken to both cut and fix very exactly, and, where possible, good brown holland might be used instead of calico, it is firmer and will bear more handling; let each child have one piece placed in front of him, upon desk or lap, hem at top, and towards the child; now proceed in the following way: with the right finger and thumb pick up strip by right top corner; hold it in front of face about level with the eyes just below where held grasp with left hand, first finger and thumb, then place the inch above this over nail of left finger, grasp it with second left finger so that hem is held firmly by thumb and second finger of left hand—the work hangs in the hand. Let elbow be put in to side as in Drill V., and you will have secured Drill VI., Sheet II. This placing of work should be shown by the teacher several times, and at first every child should have it placed for him. No amount of description will do for these manual operations in some cases. We have now gone through all necessary preliminary steps, and are ready for the *stitch*.

I have imagined that these last three exercises will be given to children ranging from four to five years of age, but the *combination* and *work placing* should go on throughout the entire school, preceding each lesson, and in many good girls' departments I observe that the plan obtains of adjusting the positions to suit the several kinds of garments and stitches. With regard to the time to be occupied, this should not exceed half-an-hour at one sitting, this every day during the month or two necessary to initiate them in the whole six, will give ample opportunity for perfection.

In schools where there is no infants' department the teacher should leave out the threader and bead drills, and form two lessons of 3, 4, 5, 6. Great patience is needed if a satisfactory result is to be obtained, and if the children are to get the Code work below Standard I. done during the year; at least two months will be well spent in the preliminary drills before a stitch is taken. Years of experience in different methods compel me to say that bad and indifferent work is due not to a want of energy but to a want of slow deliberate planning well carried out, and results waited for and confidently expected.

Before going on to stitches a word may be said here to those of my readers who find the instruction of boys in needlework distasteful.

Many arguments for and against have found their way into our educational magazines, but the most foolish of all is to suppose that the training is of no use. Surely any and every effort to train the fingers is of some use, whether that of needlework is the best for boys is open to grave doubts, but in the absence of other, and pending the recent grand scheme for technical education, it will be well for teachers to recognise even the little permission granted by the Department as an earnest of better things to come. That boys are less able to profit by the teaching, less capable of neat manipulation, &c., can only be said by those who are quite ignorant of the subject.

Watch-making, requiring the most delicate handling, is in this country almost entirely in the hands of men who in boyhood have served an apprenticeship to the trade. One may venture to say that all manual occupations requiring skill of manipulation are in the hands of men. Given the same teaching, boys will work Schedule III. with as good result as girls; but they seldom get the same teaching, there being a strong tendency to ignore their power as well as their need. A poorer reason for teaching boys is that organization is easier, especially in small schools. It will be understood that the above remarks have reference to infants' schools only.

SHEET II.

NEEDLE THREADING DRILL. No. 4.	COMBINATION DRILL OF THIMBLE AND NEEDLE. No. 5.	WORK PLACING DRILL, LEFT HAND. No. 6.
1. Pick up cotton with the right hand.	1. Put on thimble.	1. Pick up work (right hand) top right hand corner.
2. Point it nicely with left hand.	2. Pick up needle (left hand).	2. Grasp it with left hand finger and thumb, just below where held (on the hem).
3. Pick up needle, left hand.	3. Bring eye of needle to thimble.	3. Put small end over first finger nail of left, with right hand.
4. Put hands together, 3rd and 4th fingers of right on knuckles of left.	4. Grasp needle with right hand a little below the eye.	4. Hold it firmly with second finger and thumb.
5. Move right hand slowly forwards, point of cotton through eye of needle.	5. Take long end cotton in left hand, pass it over right hand between 2nd and 3rd fingers.	5. Hold long end of work with right hand (to be shown so).
6. Grasp needle with right hand and cotton with left.	6. Put right elbow in to the side, point needle to the left, turn wrist a little inwards.	6. Put elbow to side and bend wrist in a little.
NOTE.—This differs a little from Nos. 1 and 2, but this difference is of little moment, again six operations complete the drill though eight might be used—fewer the better for the future work.	NOTE.—The needle is threaded and stuck upon a small piece of felt—No. 6 is a good size—and No. 36 cotton. Needle should not be too short.	NOTE.—No. 5 is to enable the teacher to see the work as No. 6 must be a position order and therefore not a suitable one for examination.

When patterning these drills the right hands should be used, the plan prevalent in some schools of using Teacher's left for right is extremely bewildering and the principle is wrong altogether, if necessary the back should be turned to the class rather than suffer a left hand operation for that used by the right, and a larger specimen should always be used by the teacher for demonstration.

How my School was Examined.

BY A

SCHOOLMASTER IN A COUNTRY TOWN.

ON the day appointed and punctually at the time fixed by notice H.M. Inspector and his assistant arrived. The boys were assembled in their proper places, each having on the desk before him everything necessary for the Inspector to proceed at once with the examination, namely, his schedule number on a label, three reading books, examination papers with name, &c., filled in, a pen, blotting-paper, copy and exercise-books to show, and, in Standards V., VI., VII., blank paper for mapping, with all needful drawing material as well as three painted maps which had been drawn by the boys for inspection. These latter were collected, and all wall-maps turned before the examination commenced.

The Inspector inquired for absentees. One only was missing, and he eventually presented himself with the excuse that he had been attending his sister's wedding.

Two pieces selected by the Inspector were sung, and afterwards one chosen by the head-master. After this all boys above Standard II. were mixed in the desks somewhat after this fashion: a Standard III. boy was placed in position, then a IV., then a V., then III., IV., VI., then III., IV., VII., and so on until the back rows of desks down the whole length of the school were filled. The same method was adopted for filling the two front rows of desks. When all were seated cards of Arithmetic were given to the boys of Standard IV., Composition to Standards VI. and VII., Dictation to Standard III., and Standard V., having been called out to a gallery at the end of the room, heard a story read to them by the Assistant Inspector. When this done was cards of Arithmetic were given to all, three sets as a rule being given to each Standard.

The greater part of the Reading and Class-subject work was heard in the class-room by the Chief Inspector, or on the gallery by the Assistant; and the frequent changes consequent thereon were made before the children had finished all their paper work. It happened once or twice that orders were given for a certain standard to go in the class-room without its being stated for what reason; and on arriving there all were ordered back to bring their books or copy-books. All English work was *viva voce;* the whole was taken quietly, and very few of the questions could be heard at a little distance from the children.

STANDARD I.

The following plan was adopted for examining Standard I. in English. The children were put in front of the desks where Standards III. to VII. were at work, and the Inspector heard the recitation—'Good Night and Good Morning,' and questioned thereon, while the Teachers were calling out the Dictation to Standard III.

For Reading in Standard I. each child had two books, and part of the class read from one and part from the other.

Geography was examined thus:—A plan of the school was drawn on the blackboard, and such questions as the following were asked:—What is drawn on this board? What do you see there? What do these lines stand for? (pointing to lines representing walls, and also to those representing the gallery). Name the four chief points of the compass. Name four others. Point out N., S., E., W., also N.E., S.E., N.W., S.W. How do we find out these points?

For Dictation and Arithmetic the children were placed back to back in one long row in front of the higher classes and the same set of words and sums were dictated to all.

Words.—*Shelf, Sugar, Kittens, Ladies, Sunday, Table, Garden, Fear, Coffee, Cocoa.*

Sums.—1. From 970 take 28.
2. Take 709 from 980.
3. Add 796, 28, 7, 64, 985.

Answers:—(1) 942; (2) 271; (3) 1880.

Tables, oral:—5 × 8, 6 × 9, 5 × 12, 4 × 8, 3 × 9, 6 × 7.

STANDARD II.

All the children were put back to back in front of the desks where Standards III. to VII. were working on paper, and the Inspector called out the sums while the teachers were calling out the dictation for Standard IV. The written work of this Standard as of Standard I. was done on slates.

Arithmetic.—1. 84,605 ÷ 8.
2. 78,160 × 9.
3. 86,473 × 890.
4. From 19,408 take 4,907.

Answers:—(1) 10,575⅝; (2) 703,440; (3) 76,960,970; (4) 14,501.

Mental Arithmetic,—12 times 12; 11 times 12; 9 × 7; 8 × 9; 12 × 13; 12 × 14; 9 × 12; 9 × 11; 9 × 9; 8 × 12; 12 × 16; 144 pence; 132 pence.

Geography.—What are a river, mountain, sea, lake, peninsula, channel, strait, isthmus, island?
What are the bed, source, and mouth of a river?
What good is a river?
What is a sound?

Reading.—Each boy had two readers, and some read from one and some from the other, the Chief inspector hearing them.

English.—Such questions were asked as, What is a poet?
What is a noun? What is a verb?

Dictation.—A passage from the Geographical Reader: 'Men are fishing in the stream; cattle are drinking of its bright clear waters; boats and barges are passing. At the villages we see bridges or ferry boats to take people over the river. The towns have places for loading and unloading, for making and mending the boats and barges.'

STANDARD III.

Arithmetic.—A. 1. If 1000 marbles were to be divided among 50 boys, but 5 boys were absent and 55 marbles broken, how many would each boy present receive?

2. What must be multiplied by 63 to get the same answer as 1393 by 162?

3. From £20,001 7s. 4½d. take £10,596 19s. 9½d.

4. Add £12 19s. 8½d., £706 15s. 10½d., £7,801 10s. 7½d., £8,107 15s. 0½d., £60,317 18s. 5½d., £777 13s. 11¾d.

B. 1. Divide one hundred and ten thousand and five by one hundred and eighty six.

2. A boy had a bag of marbles out of which he gave 19 boys 7 each. He then had 62 left. How many had he at first?

3. A and B have together £36,000. If A has £9,709 18s. 6½d., how much has one more than the other?

4. Take £79,017 18s. 10¼d. from a quarter of a million pounds.

Answers:—*A.* (1) 21; (2) 3,582; (3) £9,404 7s. 7d.; (4) £77,724 13s. 8½d.

B. (1) 591 + 79; (2) 195; (3) £16,580 2s. 11d.; (4) £170,982 1s. 1¾d.

Dictation,—Passage from ordinary Reader:—

'I must now pass by the village-school to which the children come from all the straggling cottages and odd farmhouses for miles around, along lanes and through woods, and across old foot-paths, bringing their dinners in little baskets, which they are constantly setting down by the roadside while they gather flowers or hunt for birds' nests in the hedges.'

English.—Sentences had to be formed, and questions answered as; What is a pronoun? A verb? An adjective? All oral.

Geography.—What country do we live in? What is Kent noted for? Name towns on the coast of England. What is a county? What is a country? Name the two northern counties of England. The county town of Devon? Of Westmoreland? Of Sussex? The largest lake of England? Towns in the Scilly Isles? County west of Devon? How far south does the Pennine chain run? What is the highest mountain in Wales? What county is it in? What is the highest mountain of the Pennine chain?

STANDARD IV

Arithmetic.—Specimen Card:—

1. How many inches are there in 2 miles 6 furlongs 4 poles 3 yards?

2. Divide £9,009 19s. 11½d. by 910.

3. What will 30 dozen bottles of wine cost at 3s. 4d. each?

4. To how many men can I pay their wages out of sixty guineas, if each man gets 31s. 6d.?

Answers:—(1) 175,140 in.; (2) £9 18s. 0¼d. + 48; (3) £60; (4) 40 men.

Mental Arithmetic.—How many lbs. in 1 cwt.? in ½ cwt.? in 1½ cwt.? 3s. 4d. per oz. is how much per lb.? 18s. 6d. is how many times 2d.? How many times 1½d. in 1s.? 90 times 1½d.?

Dictation from the ordinary reader:—

'No one who has not seen them can form an idea of the terrible grandeur of these fires. The clouds of smoke obscure the brightness of a noonday sun and darken the country. They suffocate those whom they overtake with their hot breath; and to see their forked tongues leaping forward as if seeking more food, and to hear their roar as of a hungry monster calling for its prey is to hear and see what will never be forgotten.'

English.—The children recited 'The Fakenham Ghost,' from 'Poetry for the Young.' The following words had to be explained:—dam, foliage, foal, Euston Park, echoed, benighted, hovering, circuits, dappled, patting, frame, nought, sprite, resolution, cheating, gloom, sped, regardless, distinctly, spacious, goblin, conviction.

What birds fly by night? What trees grew there? What frightened her?

The boys were also required to parse a sentence orally from the piece recited without having the book before them. The following sentence was chosen, and each word had to be parsed:—

> The little hoofs would rattle round
> Upon the cottage floor,
> The matron learned to love the sound,
> That frightened her before.

Geography.—Name sea between Scotland and Ireland. Between England and Ireland. What country is nearest to Ireland? Nearest points? Towns that trade? When counties were named, their capitals were asked for, and the names of adjacent counties, north, south, east, and west. Ireland was principally touched upon. A few questions were asked on the manufactures. In what province is Kerry? Down? Name mountains in each. What rivers are in the south of Ireland? What river runs into Youghal Harbour? Historical facts were asked with reference to Londonderry, Drogheda, and the Boyne.

STANDARD V.

Arithmetic.—Specimen Cards:—

A. 1. How much less is $\frac{3}{7}$ than $\frac{5}{9}$?

2. What will it cost for making a road 9 miles 7 fur. 13 pls. at £6 13s. 4d. per mile?

3. A bill: 7 yds. @ 3s. 11d. per yd.; 5½ yds. @ 1s. 7½d. per yd.; 6¼ yds. @ 3s. 6d. per yd.; 24 articles @ 1s. 6d. per dozen; 21¾ yds. @ 1s. 2d. per yd.

4. A man's income is 550 guineas. He spends £1 2s. 4d. a day. What does he save in a year?

B. 1. $\frac{1}{4} + \frac{2}{3} + \frac{7}{9} + \frac{3}{7} + \frac{1}{8}$.

2. A bill: 18½ lbs. @ 5½d. per lb.; 400 @ ¼d.; 30 articles @ 1s. 9d. per doz.; 17 @ 1s. 5¾d.; 90 articles at 4½d. per score.

3. A train uses 15 cwt. 28 lbs. of coal in one day; what will it use in 39 days?

4. A grocer buys 5 cwt. of currants for £7, and sold half of them at 5d. per lb. and half at 4d. per lb. What did he gain?

C. 1. Add $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{2}{3}$.

2. If 3 cwt. 2 qrs. 14 lbs. are carried 24 miles for £1 10s., how far should 1 ton 9 cwt. be carried for the same money?

3. A bill: 11 lbs. @ 11d.; 7¼ lbs. @ 10d.; 300 eggs @ 9d. per doz.; 17½ lbs. @ 10d.

4. A man bought 15 sheep for £60. He kept them 17 weeks @ 1s. 3d. per week each, and sold them for £90. What did he gain?

Answers:—*A.* (1) $\frac{1}{63}$. (2) £66 2s. 1d. (3) £1 7s. 5d. + 8s. 11½d. + £1 1s. 10½d. + 3s. + £1 5s. 4½d. = £4 6s. 7¼d. (4) £169 18s. 4d.

B. (1) $2\frac{713}{855}$. (2) 8s. $5\frac{3}{4}$d. + 8s. 4d. + 4s. $4\frac{1}{2}$d. + £1 5s. $1\frac{3}{4}$d. + 1s. $8\frac{1}{4}$d. = £2 8s. $0\frac{1}{4}$d. (3) 29 tons 14 cwt. 3 qrs. (4) £3 10s.

C. (1) $1\frac{1}{8}$. (2) 3 miles. (3) 10s. 1d. + 6s. $0\frac{1}{2}$d. + 18s. 9d. + 14s. 7d. = £2 9s. $5\frac{1}{2}$d. (4) £14 1s. 3d.

Mental Arithmetic.—How much is $\frac{1}{16}$ of £1? $\frac{9}{16}$ of £1? What fraction is left? How much is $\frac{7}{16}$ of £1?

Composition.—A newspaper extract was read over to be reproduced from memory:

STRANGE CAPTURE OF A HARE.

Mr. Matthews writes of a strange capture of a hare. A neighbour of his was walking in the evening through his field in Pembrokeshire when he heard the cry of a hare. He went towards it, expecting to see the creature caught in a trap. But to his astonishment he saw that a hedgehog had got hold of one of its hind legs. The hare seemed paralysed with fear. It allowed the man to take it up. As soon as the hedgehog was shaken off the hare died, although the injuries it had received seemed but slight.

English.—What do you mean by *Nominative, Transitive, Intransitive, Verb, Predicate?* Analyse (orally) 'Perhaps with this intention you leave him at home.' What is 'at home?' Parse the words underlined: 'The *attendance* of *your affectionate* Roger *is* apt to be not less *troublesome* when you go to make a call. *Perhaps* with this intention you leave him at home.'

The children recited from '*The Lady of the Lake.*' The following words had to be explained:—Heather, bracken, dappled, arraignment, matins, plaids, aught, dwarfish, perchance, hardihood, osiers.

Name the mountains and rivers mentioned in the poetry learnt. What river runs by Stirling? Which is the larger, the Forth or the Teith?

Standards VI. and VII., having learnt the same poetry as V. with additional lines, were asked the same questions.

Geography.—Where is Turkey? Name the islands around. Name those around Greece. What peninsulas are in Europe? Name chief towns of Greece. What is Spain? Name the rivers of Europe. Where do they rise? Through what countries do they pass? Into what seas do they enter? Were you ever on an island? Name it. (Great Britain given by one boy.) Where are the Ionian Islands? To whom do they belong? What are they noted for? What do you mean by Minorca and Majorca?

STANDARD VI.

Arithmetic.—Cards:—

A. 1. Simplify $\frac{2\frac{1}{8} \times 3\frac{1}{8} \times 5}{7{\cdot}25}$.

2. If $8\frac{1}{4}$ tons cost £9 16s. how many shillings will $\frac{1}{4}$ ton cost?

3. What part of 21 guineas is equal to $\frac{3}{7}$ of 19 florins?

4. A boy put £7 in a savings bank, interest at the rate of £1 5s. for £50 for a year. He drew it out in 11 months. What sum did he receive?

B. 1. Eggs are sold @ 15·75d. per score; find price of $13{\cdot}\dot{3}$ dozen.

2. What decimal of 2s. 6d. is $\frac{5}{16} \times \frac{3}{5}$ of £$\frac{2}{3}$?

3. How many books $\frac{2}{3}$ of an inch thick can be placed on five shelves, each $1\frac{2}{3}$ yards long?

4. A, B, and C own a ship worth £11,000. A's share is $2\frac{2}{11}$ of C's share. B's share is $\frac{5}{6}$ of A's, and C's share is $\frac{1}{2}$ of the whole. Find the value of each one's share.

C. 1. Find value of ·6 of £$1{\cdot}\dot{6} \div {\cdot}875$ of 2·5.

2. If one share is worth 1s. $6\frac{3}{11}$d., what are 1,342 worth?

3. 2 acres 3 rds. cost £34 17s. 3d. What would half an acre cost?

4. 1,000 lemons were bought at 9d. per doz. 360 were sold @ 10d. per doz., and 450 at 15d. per doz. What must each of the remainder be sold for to gain 14s. 2d. on the whole?

Answers.—*A.* (1) $5\frac{5}{174}$. (2) $3\frac{4}{15}$s. (3) $\frac{38}{1020}$. (4) £7 3s. $2\frac{1}{2}$d.

B. (1) 10s. 6d. (2) $1{\cdot}\dot{6}$. (3) 450 books. (4) A £4,800, B £4,000, C £2,200.

C. (1) 9s. $1\frac{5}{7}$d. (2) £102 3s. 6d. (3) £6 6s. $9\frac{3}{11}$d. (4) $\frac{33}{76}$d.

Composition.—Write a letter about a circus, or about a trade. In the latter, address to a master a form of application for a situation. The former was suggested by the fact that the town was placarded with posters announcing the coming of a circus in the following week.

STANDARD VII.

Arithmetic.—A. 1. If 15 carts making 7 journeys in a day can fetch 1,260 tons in 6 days, how many carts shall I require to fetch 1,000 tons in 2 days, making 10 journeys a day?

2. A merchant went to China for ten years. The first year he made £785; in the next three years he made altogether £1,500; in the next year he made nothing, and in the remaining years he made on an average £345 a year. Find the average annual gain for the ten years.

3. Nine gallons, of which 70 per cent. is pure spirit, are mixed with 6 gallons, of which 85 per cent. is pure spirit. What per cent. of the mixture is pure spirit?

4. If a grocer buys tea at £7 7s. per cwt., and retails it at 1s. 8d. per lb., how much must he sell to clear £153?

B. 1. 55 men do a piece of work 6 furlongs long and 15 yards wide in 14 days. In what time would 30 men do a piece 2 miles long and 10 yards wide?

2. Find average of $17\frac{1}{2}$, $25\frac{3}{4}$, 96, 10, 0, $43\frac{3}{4}$, 19, and 37, and reduce fractional answer to a decimal.

3. A farmer had 240 animals, $29{\cdot}1\dot{6}$ per cent. are cows, $33{\cdot}\dot{3}$ per cent. are sheep, and the remainder horses. Give correct number of each.

4. Reduce 30 yards to the decimal of 1 mile, and $2\frac{1}{2}$ acres to the decimal of 3 square yards.

C. 1. Find the average price per acre of the following:—500 acres at £2 per acre, 472 acres at £1 10s. per acre, 315 at £1 15s. per acre, 290 at £1 12s. per acre.

2. Simplify $5\frac{1}{2}$ of $\frac{4\frac{1}{2} \times 6{\cdot}\dot{7}\dot{5}}{{\cdot}7 \div 3{\cdot}45} - 2\frac{1}{2}$.

3. 500 men are in a garrison with orders to hold out 53 days, allowing each man 1 lb. of bread and $\frac{1}{2}$ lb.

of meat daily. After 21 days had passed 290 more men were sent in with orders to hold out 40 days. How much must each have daily?

4. A leap year began on a Sunday. What decimal would the Sundays be of the whole year?

Answers.—*A.* (1) 25 carts. (2) £401. (3) 76 per cent. (4) $77\frac{1}{7}$ cwts.

B. (1) $45\frac{17}{21}$ days. (2) $31\frac{1}{8} = 31{\cdot}125$. (3) 70 cows, 80 sheep, 90 horses. (4) ·017045, and 1033·3.

C. (1) £1 14s. $6\frac{702}{1577}$d. (2) $821\frac{45}{56}$. (3) $\frac{40}{70}$ lbs. bread and $\frac{30}{70}$ lbs. meat. (4) ·1448 + etc.

Composition.—Write all you know about the wild animals of this country, introducing a story if you can.

In the remaining subjects Standards VI. and VII. were examined together.

Grammar. The whole of this part of the examination was oral. The children had their reading books in their hands, and the Inspector read out the following sentences and told the children where to find them.

A. 'They always search their abode for any object they may have lost.'

B. 'Noxious animals *have been replaced* by the *naturalisation* of many of the foreign *fauna which* are either distinguished for their beauty or *valuable* for their flesh.'

C. '*This* transfer *which* adds so much to the richness of the country can be vastly *accelerated*.'

D. 'But we can no longer tarry to speculate further on the riches of this *aviary* which contains rare specimens of birds from all parts of the world.'

The boys were questioned as to the kinds of these sentences, and how their parts are joined; and the words in italics had to be parsed. The prefixes *re*, *dis*, *trans*, and *ac* were taken as subjects for questioning. Words containing prefixes were given, and the meaning and different forms of the prefix asked for.

Mental Arithmetic.—If an orange cost 1d., and was sold for $1\frac{1}{4}$d., what was the gain per cent.?

Geography.—Standards V., VI., VII. had prepared the same geography, namely, Europe; but the two upper Standards were examined apart from V. No maps were allowed to be seen during the examination.

Name the islands of Europe. (The Hebrides and other islands round Great Britain were required.) Name the towns on those islands. What are the chief volcanoes of Europe, and what towns have they destroyed? What is the south of Greece called? What countries are around Turkey? Round Austria? Where do the rivers Rhine and Rhone rise? What were the Greeks noted for? The Romans? What is the capital of Malta and what is it used for? What is the capital of Portugal? What caused the trade of Venice to decline, and what is causing it to rise again? What are the mountains called which stretch down through Italy? What place has suffered from earthquakes? What are the chief naval stations in France? Name the Channel Islands. Where is the island of Elba, and what is it noted for? What is the peninsula called which connects the Morea with the northern part of Greece? What celebrated pass is there in Greece, and what happened there? Name the straits which divide the islands of Corsica and Sardinia. What strait divides the island of Sicily from Italy? Where are the Lipari Isles? Where is the town of Syracuse? What is the cape in the heel of Italy?

How to Teach School Children to Sing from Notes.

BY W. G. McNAUGHT,
Associate of The Royal Academy of Music.

DIVISION II.

Time—continued.

52. The foregoing sections deal with all the time work required at sight by the Code from this Division. It would, however, be unwise for teachers to confine all the exercises and songs to these narrow and monotonous limits. At least the division of a pulse into halves should be properly taught.

53. The first thing to do in teaching half pulse tones is to make the ear perfectly familiar with the effect and to reserve the notation until this is accomplished. Thus for several lessons the teacher should monotone to *laa* such exercises as these:

(*a*) |1 :1 |1.1:1 || (*b*) |1 :1.1|1 :1 ||

(*c*) |1.1:1 |1 :1 || (*d*) |1 :1 |1 :1.1||

where in four pulses the position of the half-pulse tones is varied, and he should get the class to describe where the half-pulse tones fall and to imitate the pattern.

54. The time name for half-pulses should be introduced very soon after the effect of the division is felt and imitated, and may precede the teaching of notation. The time name for two tones equally dividing a pulse is

TAA TAI (pronounced tah-tay).

This name must be pronounced as one word of two syllables, and must in its pronunciation accurately reproduce the rhythmic effect of what it names. Both syllables must be said in the time of a full pulse TAA. It is not inconsistent to use the syllable TAA for a whole pulse tone, and for the first half only. As will be seen later on the time names (or rhythm names as they might be better called) are names for strokes on a particular *part* of a pulse rather than indications of value.

55. Great familiarity with rhythmic effects can be gained by using the time names freely, and side by side giving numerous ear exercises to be sung in time names. It is an advantage to point from name to name written on the blackboard thus:

TAA

TAA TAI

taking care, of course, that a regular pulse is maintained. In giving ear exercises in time the teacher may sing to *laa* such passages as those given in Section 53, or he may tap them with his pointer. Children take great interest in these exercises.

56. The points to bring out in fixing the notation in the minds of pupils are (1) that there are two notes in one pulse; (2) that the two notes have a dot (.) between them. Teachers should note that this dividing dot should range with the bottom of the sol-fa letters thus, :1 .1 || not thus :1 ·1 ||

57. Merely telling children that this is the notation of half-pulses will, of course, make very little impression upon their memories. They must be repeatedly called upon to come forward and find the half-pulses in a blackboard or other exercise, or they can be asked to write half-pulse notes in some pulses left empty, one child writing the notes and another the dividing dot. In order to draw great attention to the dot an exercise containing many divided pulses may be fully written on the board, and then the teacher announces that he intends to rub out all the half-pulse dots, and that he wants pupils to come forward and restore them.

58. When exercises comprising all the time so far taught can be monotoned fluently, combined time and tune should be practised. In constructing such exercises it should be noticed that half-pulses are generally easier to sing on weak than upon strong accents: that they can be sung easily on repeated tones and with stepwise movement of any tones, and with most leaps in the doh chord.

Exercises for Half-pulse tones.

(1) | d :d .d | s :s .f | m :m | s :— }
| m :m .m | m :m .r | d :d | t_1 :d .r }
| d :— | d :— | s_1 :s_1 | s_1 :l_1 . t_1 ||

This can be sung as a three part round, the second part entering when the first reaches * &c.

(2) | d :s .m | d :r .m | f :s .f | m :— }
| m :r .d | t_1 :d | r :d .t_1 | d :— ||

(3) | d .m :s .m | d :r | m :r .d | s :— ||
| l .s :f .m | r :m .f | s .f :m .r | d :— ||

(4) | s .l :s .f | m :s | d .r :m .f | m :— ||
| r :m .f | s .f :m .f | m :r | d :— ||

The above should be (1) sung to time names on a monotone; (2) to *laa* on a monotone; (3) in time and tune combined.

CODE REQUIREMENT.

EAR TEST.

To imitate a simple phrase of not more than four notes, using the syllable laa, after hearing the examiner sing (or play) it twice through.

Example

d m r d ||d' s l s ||s d' t d' ||

59. From the foregoing it will be seen that the ear tests for this Division are *only imitative, i.e.*, children are not required to *name* notes, but simply to reproduce short phrases sung or played. The wisdom of this requirement is unquestionable. The chief advantage of mere ear singing—the power it gives of picking up tunes quickly—is pressed into the service of a course of note singing, and the best possible foundation is laid for the more difficult task of telling the names of tones sung as an ear test. The requirement, therefore, is imposed less because of its inherent difficulty than because it indicates the path of preparation for naming.

60. The exercises given should be graded. At first, they should be in slow time, and should be sung two or three times before being repeated by pupils. The phrases easiest to catch are those that include leaps only in the Doh chord and that use the other tones in stepwise succession. Some tests should contain repeated tones.

Examples for imitation.

To be sung by the teacher to *laa* or to the sol-fa syllables, and imitated as sung.

Note.—Vary the key frequently. Use a high key when the s_1 is touched.

Easy.

d d s s		d s m d		d d' s m		s d m	
m r d		s t d'		s l s		s f m		d m s	
d r m		m r m		d r d		d' t d'		d t_1 d	
d s_1 d		d s_1 t_1 d		d s_1 m d		s_1 l_1 t_1 d	

Moderately easy.

s l s m		s f r d		d r f m		s l s d	
m s r d		d t_1 r d		d s t_1 d		s d' s s	
s r m d		d m f s		s f m d		m f r m	

Moderately difficult.

These represent the standard of difficulty required in the examination.

| f r m s ||l s r d ||d' t s d' ||d f r m ||
| l s m r ||t_1 r f m ||s_1 m r m ||r m s d ||

Difficult.

d' t d r		l f d m		d' l f s		f l d m	
d l m t		d t_1 s r		m f t s		l r' s f	
m t d r		d r l_1 f		s d t d'		f t_1 s r	

61. The above can be made into fresh exercises by performing them backwards. It is a good plan for the teacher to sol-fa an exercise and require the class to sing it back to *laa*. Other uses of these exercises will be described later on.

Examples for imitation.

Combined time and tune.

d :r	m .r :d			s :s .l	s .f :m	
d .r :m .f	s :m			m .f :m .r	d :—	
r .m :f	m .r :d			f .m :r .d	t_1 :d	
t_1 :d .r	d :s_1			s_1 .l_1 :t_1 .d	r :d	

(To be continued.)

—o—

Jeanne d'Arc, by Lamartine.

TRANSLATED BY A. M. BOWER,

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JEANNE D'ARC.	JOAN OF ARC.
IX.	
Pendant que sa beauté charmait les yeux,	While her beauty charmed all eyes,
le recueillement de sa physionomie,	her contemplative countenance,
la méditation de ses traits,	her thoughtful features,
la solitude et le silence	the solitude and silence
de sa vie étonnaient son père,	of her life astonished her father,
sa mère et ses frères.	her mother and her brothers.
Rien des langueurs de l'adolescence	No youthful languor
ne trahissait en elle son sexe :	betrayed her sex :
elle n'en avait que	she possessed only
les formes et les attraits.	its form and its charms.
Ni la nature ni le cœur	Neither nature nor her heart
ne parlaient en elle.	spoke in her.
Son âme, retirée dans ses yeux,	Her soul, concentrated in her eyes,
semblait plutôt méditer que sentir :	seemed rather to meditate than to feel :
pitoyable et tendre cependant,	compassionate and tender nevertheless,

mais pitoyable et tendre d'une pitié	but compassionate and tender with a pity
et d'une tendresse qui embrassaient	and a tenderness which embraced
quelque chose de plus grand	something grander
et de plus lointain que son horizon.	and more distant than her horizon.
Elle priait sans cesse,	She prayed incessantly,
parlait peu,	spoke very little,
fuyait les compagnies de son âge.	avoided the companions of her own age.
Elle se retirait ordinairement à l'écart,	Usually she withdrew to some spot, apart,
pour travailler à l'aiguille,	to work with her needle,
dans une enceinte close,	to some closed place,
sous une haie derrière la maison,	under a hedge behind the house,
d'où l'on ne voyait que le firmament,	whence she could see only the sky,
la tour de l'église,	the church steeple,
le lointain des montagnes.	the mountains in the distance.
Elle semblait écouter en elle des voix	She seemed to listen to inward voices
que le bruit extérieur	which any outward noise
aurait fait taire.	would have silenced.
Elle avait à peine huit ans,	She was barely eight years old,
que déjà tous ces signes de l'inspiration	when all these signs of inspiration
s'étaient manifestés en elle.	displayed themselves in her.
Elle ressemblait en cela	In this she resembled
aux sibylles antiques,	the ancient Sibyls,
marquées dès l'enfance	stamped from their infancy
d'un sceau fatal de tristesse,	with the fatal seal of sadness,
de beauté et de solitude	beauty and solitude
parmi les filles des hommes :	among the daughters of men ;
instruments d'inspiration	the agents of inspiration
réservés pour les oracles,	reserved for the oracles,
et à qui tout autre emploi	and to whom every other employment
de leur âme était interdit.	of their soul was forbidden.
Elle aimait tout ce qui souffre,	She loved everything which suffers,
les animaux, ces intelligences douées	animals, those creatures endowed
d'amour pour nous et privées	with love for us and deprived
de la parole pour nous le communiquer.	of speech in order to impart it (love) to us.
Elle était, disent ses compagnes,	She was, said her companions,
miséricordieuse et douce pour les oiseaux.	compassionate and gentle to birds.
Elle les considérait comme	She looked upon them as
des créatures condamnées par Dieu	creatures ordained by God
à vivre à côté de l'homme	to live side by side with man
dans les limbes indécises	in the uncertain borderland
entre l'âme et la matière,	between the soul and matter,
et n'ayant de complet encore dans leur être	and having no perfection as yet in their being
que la douloureuse faculté	except the torturing faculty
de souffrir et d'aimer.	of suffering and loving.
Tout ce qui était mélancolique	Everything which was melancholy
et infini dans les bruits de la nature	and infinite in the sounds of nature
l'attirait et l'entraînait.	attracted her and carried her beyond herself.
'Elle se plaisait tellement	'She delighted so much
au son des cloches,	in the sound of bells,
dit le chroniqueur,	said the chronicler,
qu'elle promettait au sonneur	that she promised to the bellringer
des échevaux de laine	skeins of wool
pour la quête d'automne,	for the autumn collection,
afin qu'il sonnât	in order that he might ring
plus longtemps les *Angelus*.'	a longer peal at the *Angelus*.'
Mais elle s'apitoyait surtout	She was especially moved with pity
sur le royaume de France	for the kingdom of France
et sur son jeune Dauphin,	and for her young Dauphin,
sans mère, sans pays et sans couronne.	without mother, country or crown.
Les récits qu'elle entendait faire	The tales that she heard related
tous les jours par les moines,	every day by monks,
les soldats, les pèlerins et les mendiants,	soldiers, pilgrims and beggars,
ces nouvellistes des chaumières en ces temps-là,	the cottage newsmen of those times,
remplissaient son cœur de compassion	filled her heart with pity
pour ce gentil prince.	for this gentle prince.
Son image s'associait,	His image was associated,
dans l'esprit de la jeune fille,	in the mind of the young girl
aux calamités de sa patrie.	with the woes of her country.
C'était en lui	It was in his person
qu'elle la voyait périr,	that she saw it (France) perishing,
en lui qu'elle priait Dieu	in his person that she prayed God
de la ressusciter.	to raise it up again.
Son esprit était sans cesse	Her mind was for ever
occupé de cette rêverie	busy with these thoughts
et de cette tristesse.	and with this sorrow.
Faut-il s'étonner	Can we wonder
qu'une telle concentration de pensée	that such a concentration of thought
dans une pauvre jeune fille	in a poor young girl
ignorante et simple,	(who was) ignorant and simple,
ait produit enfin	should have at last produced
une véritable transposition de sens	a real transposition of the senses
en elle et qu'elle ait entendu	in her and that she should have heard
à ses oreilles les voix intérieures	in her ears those inner voices
qui parlaient sans cesse à son âme ?	which incessantly spoke to her soul ?
Il y a si près de l'âme	Our soul is so closely allied
aux sens dans notre être,	to our senses in our life,
que, si les sens trompent	that if the senses deceive
et troublent l'esprit	and disturb the mind
par leur exaltation et leur désordre,	by their super-exaltation and disturbance,
l'esprit de son côté trompe	the mind on its side deceives
et trouble facilement les sens.	and easily disturbs the senses.
Ces visions et ces auditions merveilleuses,	These wonderful visions and voices,
bien qu'elles puissent être illusions,	although they may be illusions,
ne sont pas mensonges pour ceux	are no lies for those
qui les éprouvent et qui les racontent.	who experience and relate them.
Merveilles sincères, elles sont phénomènes,	Sincere marvels, they are phenomena,
quoiqu'elles ne soient pas prodiges.	although they are not prodigies.
Il est difficile à l'homme,	It is difficult for a man,
plus encore à la femme,	still more so for a woman,
lorsqu'ils sont préoccupés	when they are absorbed
jusqu'à la passion	with their whole soul

d'une idée ou d'un doute,
lorsqu'ils s'interrogent
et qu'ils s'écoutent en dedans,
de distinguer entre leur propre voix
et les voix du ciel,
et de se dire :
'Ceci est de moi ; ceci est de Dieu.'
Dans cet état, l'homme se rend
à lui-même ses propres oracles,
et il prend son inspiration pour divinité.

Les plus sages des mortels
s'y sont trompés
comme les plus faibles des femmes.
L'histoire est pleine de ces prodiges.

L'Égérie de Numa,
le génie familier de Socrate,
n'étaient que l'inspiration écoutée
à la place des dieux dans leur âme.
Comment une pauvre bergère
d'un village hanté par les fées,
nourrie de ces révélations populaires
par sa mère et par ses compagnes,
aurait-elle douté de ce que Socrate
et Platon consentaient à croire ?
La candeur fut le piège de sa foi ;
son inspiration eut les vertiges de son âge,
de son sexe, de son époque, de sa crédulité.
Elle crut à des voix,
à des visions, à des prodiges ;
mais l'inspiration elle-même
fut la merveille,
et le patriotisme triomphant
atteste du moins en elle
la divinité du sentiment
et la vérité du cœur.

in an idea or a doubt,
when they question (examine) themselves
and when they listen to the inward voice,
to distinguish between their own (inward) voice
and the voices from heaven,
and to say to themselves :
'This (voice) comes from myself ; that from God.'
In this state man interprets
his own oracles to himself,
and mistakes his own inspiration for (the voice of the) Divinity.

The wisest of mortals
have been thus deceived
as well as the weakest of women.
History is full of these prodigies.

Numa's Egeria
the familiar spirit (genius) of Socrates,
were nothing but an inspiration (which was) obeyed
instead of the gods in their soul.
How could a poor shepherdess
in a village frequented by fairies,
brought up among popular superstitions
by her mother and companions,
(how) could she have disbelieved what Socrates
and Plato were satisfied to believe ?
Her (very) candour was the snare of her faith (belief) ;
her inspiration partook of the giddiness of her age,
her sex, her times, her credulity.
She believed in voices,
in visions, in prodigies ;
but inspiration itself
was the marvel,
and triumphant faith
prove at least in her
the divinity of her feelings
and the truthfulness of her soul.

X.

Elle entendit longtemps ces voix
avant d'en parler
même à sa mère.
Un éblouissement de ses yeux
les lui faisait présager

par une explosion de douce lumière
qu'elle se figurait
découler du ciel.
Tantôt ces voix lui recommandaient
la sagesse, la piété, la virginité ;

She had heard those voices long
before speaking of them
even to her mother.
A dazzling of the eyes
foreboded them (the voices) to her

by an outburst of gentle light
which she imagined
came down from heaven.
Sometimes these voices urged on her
wisdom, piety, chastity ;

tantôt elles l'entretenaient

des plaies de la France
et des gémissements
du pauvre peuple.
Un jour, à midi, dans le jardin
où elle était seule,
sous l'ombre du mur de l'église,
elle entendit distinctement
une voix mâle qui l'appela

par son nom et qui lui dit :

'Jeanne, lève-toi ;
va au secours du Dauphin,
rends-lui son royaume de France !'
L'éblouissement fut si céleste,

la voix si distincte
et la sommation si impérative,

qu'elle tomba sur ses genoux
et qu'elle répondit en s'excusant :
'Comment le ferais-je,
puisque je ne suis qu'une pauvre fille,
et que je ne saurais ni chevaucher
ni conduire des hommes d'armes ?'
La voix ne se contente pas
de ses excuses :
'Tu iras, dit-elle à Jeanne,

trouver le seigneur de Baudricourt,
capitaine pour le roi à Vaucouleurs,
et il te fera conduire au Dauphin.
Ne crains rien ; sainte Catherine
et sainte Marguerite viendront t'assister.'
A cette première vision,
qui la fit trembler et pleurer d'angoisse,
mais qu'elle garda encore
comme un secret entre elle et les anges,
d'autres succédèrent.
Elle vit saint Michel
armé de la lance, vêtu de rayons,
vainqueur des monstres,

tel qu'il était peint
sur le tableau de l'autel
de son hameau.
L'archange lui dépeignit

les déchirements et

les asservissements du royaume.
Il lui demanda
compassion pour son pays.

Sainte Marguerite et sainte Catherine,
figures divines et populaires
dans ces contrées,
se montrèrent dans les nues

at other times they conversed with her

on the wounds of France,
and the groaning
of its wretched people.
One day, at noon, in the garden,
where she was alone,
under the shade of the church-wall,
she distinctly heard
the voice of a man who called her

by her name and said to her :

'Joan, arise ;
go to the aid of the Dauphin,
restore to him his kingdom of France !'
The dazzling vision was so heavenly,

the voice so distinct
and the summons so imperative (commanding),

that she fell on her knees
and replied as she (thus) excused herself :
'How can I do so,
since I am only a weak girl,
and since (*que*) I know neither how to ride
nor how to lead (command) armed men ?'
The voice was not satisfied with her excuses :
'Thou must go, it said to Joan,

and find the Lord of Baudricourt,
a captain of the king at Vaucouleurs,
and he will take (conduct) thee to the Dauphin.
Fear nothing ; Saint Catherine
and Saint Marguerite shall come to help thee.'
To this her first vision,
which made her tremble and weep with anguish,
but which she still kept
as a secret between her and the angels,
other (visions) succeeded.
She saw St. Michael
armed with a spear, clothed with rays of light,
the vanquisher (destroyer) of monsters,

such as he was painted
on the altar picture
in her hamlet.
The Archangel described to her

the intestine commotions and

the enslaving of the kingdom.
He exacted from her
compassion for her poor country.

St. Marguerite and St. Catherine,
divine and popular figures in that country,
showed themselves in the clouds

comme il avait été annoncé.
Elles lui parlèrent
avec ces voix de femmes
adoucies et attendries
par l'éternelle béatitude.

Des couronnes étaient sur leurs têtes ;
des anges, pareils à des dieux,
leur faisaient cortège.
C'était tout le poème du paradis
entr'ouvert devant ses yeux.
Son âme, dans ce divin commerce,
oubliait la rigueur de sa mission
et s'abîmait dans les délices

de ces contemplations.
Quand ces voix se taisaient,
quand ces figures se retiraient,

quand ce ciel se refermait,

Jeanne se trouvait baignée de pleurs.
'Ah ! que j'aurais voulu,

dit-elle elle-même,
que ces anges m'eussent emportée avec eux !...'
Mais sa mission terrible
ne le voulait pas.
Elle ne devait être emportée
où elle aspirait que
sur les ailes de flamme de son bûcher.

as had been announced.
They spoke to her
with a woman's voice,
grown soft and tender
from (the enjoyment of) everlasting bliss.

Crowns were on their heads ;
angels, like unto gods,
accompanied them.
It was the whole poem of Paradise
displayed to her gaze.
Her soul, in this heavenly intercourse,
forgot the terrors of her mission
and was overwhelmed in the rapture

of these visions.
When these voices ceased,
when these figures (forms) vanished,

when the heavens were closed,

Joan was found bathed in tears.
'Oh ! how I could have wished,

she herself said,
that those angels had borne me away with them !'
But her terrible mission
willed it not thus.
She was not to be carried away
where she (so ardently) desired (to go) except
on the wings of the flames of her stake.

XI.

Ces entretiens, ces sommations,

ces délices, ces angoisses,
ces délais durèrent plusieurs années.
Elle avait fini
par les confesser à sa mère.
Le père et les frères en étaient instruits.
La rumeur en courait dans la contrée :
sujet de merveille pour les simples,
de doute pour les sages,
de sarcasme pour les méchants !
En ce même temps,
la même idée et les mêmes visions
travaillaient, en d'autres pays,
d'autres filles et d'autres femmes.
Quand le peuple n'espère plus rien
des hommes pour son soulagement,
il se tourne vers les miracles.
Il y avait contagion
de merveilles et de révélations.
Une femme du Berry,
nommée Catherine,

These conversations, these commands (tasks imposed),

these joys, these tortures,
these postponements lasted several years.
She finished
by telling them to her mother.
The father and brothers were informed of them.
The rumour thereof ran through the country :
a cause of astonishment to the simple,
of doubt to the wise,
of detraction (scandal) to the wicked !
At the same time,
the same idea and the same visions
inspired, in other countries,
other maidens and other women.
When a nation has no longer any hope
in its men for its relief,
it betakes itself to miracles.
There was a contagion
in miracles and apparitions.
A woman of Berry,
named Catharine,

voyait des dames blanches, à robes d'or,
qui lui ordonnaient
'd'aller par les villes
demander des subsides et
des hommes d'armes pour le Dauphin.
Il fallait que le Dauphin lui donnât
des écuyers et des trompettes
pour proclamer partout
qu'on lui devait apporter
les trésors enfouis et
qu'elle saurait bien les découvrir.'

Ainsi, quand un miasme est dans l'air,

tout le monde le respire.
La pitié de la France,
la tendresse pour le Dauphin,
la haine contre les Bourguignons,
l'horreur de la domination étrangère,
fanatisaient les femmes.
Toutes entendaient le cri de la terre,
quelques-unes les voix d'en haut.
De plus, les poètes, les romanciers
et les conteurs ambulants du moyen âge
avaient habitué les imaginations
aux rôles belliqueux
joués par des femmes,
ainsi qu'on le retrouve
dans le Tasse et dans l'Arioste.
Elles suivaient leurs amants
aux croisades, leur servaient de pages
ou d'écuyers, revêtaient l'armure,
maniaient le coursier,
versaient leur sang pour leur Dieu,
pour leur patrie, ou pour leur amour.
Ces déguisements de la femme
sous la cuirasse donnaient aux guerres,
même civiles, un caractère
de chevalerie et d'aventures touchantes,
de merveilleux romanesque
qui faisait songer les enfants
et devait produire de fréquentes imitations.

Il se rencontre toujours
un être d'exception pour réaliser
ce qui est imaginé par tous.

L'idée d'une jeune fille
conduisant les armées au combat,
couronnant son jeune roi

saw ladies in white, with robes of gold,
who bade her
'go through every town
to ask for subsidies
and armed men for the Dauphin.
The Dauphin was compelled to give her
squires and trumpeters
to proclaim everywhere
that they must bring him
the buried treasures
and that she would know very well (where) to find them.'

In the same way, when a miasma (plague) is in the air,

everyone breathes it.
Compassion for France,
affection for the Dauphin,
hatred against the Burgundians,
horror for foreign domination,
made the women fanatics.
All heard the cry of the country,
some the voices from heaven.
Moreover, the poets, the romance writers
and the strolling minstrels of the Middle Age
had accustomed the imagination
to the warlike course (*rôle*)
played by women,
just as we find it
in Tasso and Ariosto.
They followed their lovers
to the Crusades, served them as pages
or as squires, put on armour,
managed their steed (charger),
shed their blood for their religion,
for their country or for their love.
These disguises of women
under the cuirass gave to wars,
even (to) civil (wars), a touch
of chivalry and stirring adventures,
romantic wonder (or wonderful romance),
which set the children's minds thinking
and which was destined to produce frequent imitations.

There always happens to be
an exceptional being to embody
what is in the minds of everyone.

The idea of a young girl
leading armies to battle,
crowning her young sovereign

et délivrant son pays,	and delivering her country,
était née de la Bible	had sprung from the Bible
et du fabliau à la fois.	and from the *fabliau* at the same time.
C'était la poésie de village.	It was the poetry of the village.
Jeanne d'Arc en fit	From it (*en*) Joan d'Arc
a religion de la patrie.	formed the religion of her country.

Grammatical Notes, Questions, Sentences, and Pieces for Translation to Jeanne d'Arc.

CHAPTER VIII.

Se dé-lass-er, lit. to unweary oneself.

CHAPTER IX.

Ecouter = to listen to. Je l'écoute = I am listening to him. To silence = faire taire or réduire au silence. Silence is the only masc. word ending in *ence*. Note these verbs which govern dative: ressembler à (to resemble), nuire à (to hurt), obéir à (to obey), succéder à (to succeed), plaire à (to please). The *Angelus* is a Latin prayer offered at 6 a.m., at noon, and at 6 p.m. in Roman Catholic Churches. The prayer begins 'Angelus domini nuntiavit Mariae et concepit de spiritu sancto.' S'apitoyer = to affect oneself with pity. Gentil now means *nice* never *genteel* which is *élégant*. Il y a si près de l'âme aux sens (lit., it is so near from the soul to the senses).

CHAPTER X.

Mâle or masculine. S'abîmer (lit., to abyss itself).

CHAPTER XI.

La pitié *de la France* (objective genitive = I pity *France*). Faisait songer les enfants (after *faire* and *laisser* the French do not place the accusative but the verb—mark this construction. *Laissez jouer les enfants*, not, *laissez les enfants jouer*, let the children play). Note *un être*, a being; *un été*, a summer. *Fabliau* is usually a comic verse recital of real or possible events in the ordinary conditions of human life.

(To be continued.)

Oral Teaching: The Preparation of Lessons and of Notes of Lessons.

BY JOSEPH H. COWHAM, F.G.S.,

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CHAPTER II.

The Preparation of a Lesson.—There are very few lessons given by the pupil or student teacher which are not vastly improved by their thorough preparation. Even the commonest subjects of school instruction admit of it. One of the secrets of Dr. Arnold's success as a teacher is found in the fact that although a complete master of the subjects he taught he never faced his class without preparing the lessons for the day. The following among other reasons account for the need of preparation:—

1. **Oral Instruction is a complex effort.**—The teacher must communicate his facts and perform his experiments, he must regulate the observation of his pupils and guide their attempts at reasoning, he must estimate the effect of his teaching by the accuracy or otherwise of the answers given, he must be ready to supplement where he finds their knowledge is incomplete, correct where it is faulty, and throughout the whole he must maintain the logical sequence and continuity of his own thoughts whilst he stimulates into activity the interest and thought of his class.

Now whilst no amount of preparation will enable the novice in the art of teaching to do all this with success it is equally true that the skilled teacher is greatly aided in teaching the most familiar subjects by a careful and immediate preparation.

2. **We take most interest in that which we have recently acquired.** It is moreover reproduced by us with an added life which the recital of what remains of an old lesson never possesses. Thus the revision of an old lesson accompanied by new facts and modern and more apt illustrations imparts a freshness to the lesson as helpful to the teacher as it is stimulating to his class.

3. **Objects, Diagrams, Pictures, and Apparatus** are needed in almost every lesson and when properly used have a powerful effect in sustaining the attention of the class. Some form of object teaching may be introduced into other lessons than those specially termed object lessons. Scarcely a reading lesson is given but would be improved by the introduction of an object or a picture; the writing lesson should appeal to the eye as much as a drawing exercise; first notions of arithmetic are based upon the concrete, and the rules are often best explained by the aid of diagrammatic illustrations; no geography lesson is complete without an array of models, maps, pictures, and specimens. It is thus evident that in nearly all the ordinary subjects of school instruction (grammar excepted) the preparation of apparatus and materials is necessary.

The matter of the Lesson.

Its suitability:—This will be determined largely by the knowledge already possessed by the class. If the lesson be one of a series and given by the regular teacher of the class, the new information will readily be connected with that already supplied and thus be suited to the requirements of the pupils. Should, however, the teacher be new to his class, as is the case with students in practising schools, the teacher's first duty is to acquaint himself thoroughly with the condition of his scholars as to their knowledge of the subject he has to teach.

The amount of knowledge a teacher is able to display is of little avail if the minds of the children are unable to accept it; on the other hand the repetition of old matter will be certain to fall on unwilling ears and thus fail entirely to arouse either the interest or the thought of the class.

Its arrangement:—When by careful study the teacher has thoroughly mastered the subject matter of his lesson so as to be able to state clearly the information he wishes to communicate, and to meet any enquiries his class may start during the progress of the lesson, and when he has enquired into the condition of his class, it is then his duty to arrange his matter in the order best suited for acquisition. His object in this must be threefold (*a*) **to make acquisition on the part of his pupils easy and natural,** (*b*) **to aid and exercise the work of reproduction, and** (*c*) **to stimulate and develop, through the efforts of acquisition and reproduction, the intellectual powers of his class.**

In order to secure this threefold object the teacher must arrange his matter in logical order. There is no part of the preparation exercise which will demand higher effort than this. The lesson should be one of a series, so arranged that each lesson, whilst it provides what is new, is related to that which has gone before, and is a preparation for another lesson to follow. The several parts also of each lesson should follow a natural and logical sequence. In a lesson in Grammar, for instance, examples precede rules and definitions; in science, experiments prepare for the establishment of laws; in arithmetic, mental exercises, dealing with concrete cases, lead to the statement of rules; in geography there is the association of related facts, *e.g.*, a mountain range with its termination in a promontory on the coast; a river with the valley it has formed; the productions of a district with the industries of the people and the situation of the towns.

When the teacher is able to secure the co-operation of his pupils in the collection and classification of his facts and examples, and especially when he is able by this effort to

lead them to the establishment of general truths and their embodiment in rules and laws, then he places his class in the best possible condition for satisfying the threefold object he has in view.

Black Board Sketch.—An oral lesson should not be considered complete which does not provide an abstract by which the teacher registers on the board the results of his teaching. He cannot make this up satisfactorily as the lesson proceeds. If he attempt it he will probably put down far too much and arrange it so that it becomes more confusing than helpful. He should know exactly what his board sketch is to contain, and how it is to be arranged.

NOTES FOR A READING LESSON.*

STANDARD VI.

A. Subject matter.

'If the sea were a body of water in perfect repose it would be utterly incapable of effecting mechanical erosion. But every one knows that the sea is never absolutely at rest, and that, even in the calmest weather, its surface is ordinarily more or less troubled with waves. | It is easy to understand how these are formed. When you blow upon the surface of a basin of water, the mechanical disturbance of the air is immediately imparted to the liquid and the surface is thrown into a succession of ripples. In like manner, every disturbance of the atmosphere finds its reflex on the surface of the natural waters. | Each puff of wind catches hold of the water and heaps it up into a little hill with the face to leeward, then the crest falls and the water sinks down into a trough, as deep below the mean surface as the hill was high above it; but the next column of water is then forced up, only however to be pulled down again, and in this way the motion of the wave may be propagated across a broad expanse of water. | Drop a stone into a pond, and the same kind of action will be seen; the water all round the spot where the stone falls is first depressed in a little cup, and then rises again, the motion being taken up by the neighbouring water; and a succession of circles, each wider than the last, spreads over the pond, until the ripples at length die away upon the shore. | If any light object, such as a cork, happens to be floating on the surface, it will serve to indicate the motion of the water below. As the waves reach it the cork rises and falls, but it is not carried forward by the movement of the water. Exactly the same kind of action may be witnessed at sea. If a gull, for example, is seated on a wave it is simply rocked up and down, and not moved onwards.'—*Huxley.*

B. Preparation.

(*a*) Divide the paragraph into portions suitable for each reading effort as shown by the vertical lines above.

(*b*) Underline words and phrases requiring explanation, and prepare the form of illustration or statement which will help the class most readily to understand them. *See explanation below.*

(*c*) Read the piece over a sufficient number of times beforehand to be able to set an excellent pattern of reading.

This is best done when, by reading the passage over carefully, the order both of thought and language has become familiar.

(*d*) The class should be prepared by being in orderly arrangement in desks or on the gallery, and by each scholar having his own book.

C. Pattern Reading by the Teacher.

(*a*) Read over the first division of the piece, exaggerating slightly the emphasis upon those words and phrases requiring emphasis: *e.g.*, '**perfect repose**' and '**utterly incapable**' in the first sentence.

(*b*) Expect the scholar to lower his voice at '**repose**' as well as at '**erosion**,' and meet the difficulty by raising the pitch higher than an ordinary reading would require.

(*c*) Show the effect of the pause after '**never**' and '**absolutely**' in intensifying their meaning.

(*d*) Read '**Even in the calmest weather**' as in a parenthesis, lowering the pitch and accelerating the rate.

D. Imitation by the class.

(*a*) Call first upon a good reader.

Children are stimulated to imitate a fellow scholar's successful effort.

(*b*) Allow an inferior reader to follow, and be on the alert to correct faults of expression as well as the more easily recognised errors of pronunciation.

The latter may be corrected by the scholars, the former by the teacher. The corrections by the pupils are generally trivial and of little value, and should be allowed mainly as a device for maintaining their continuous attention.

(*c*) After correction, a faulty reader should be permitted to amend his first attempt.

Do not weary the class by repetition of faulty reading by the same or by other inferior readers, but stimulate to successful effort by an intermixture of good and of faulty readers.

E. Explanation.

The explanation of entirely new and hence unknown words and phrases may be taken before the children attempt to read, *e.g.*, '**Mechanical erosion**;' this is most probably a new idea. Show by illustration its meaning immediately after reading the passage as a pattern, and when the expression is understood, read the entire piece over again. Where, however, the context or previous instruction renders the meaning fairly clear, it is better not to interrupt the reading, but to take the explanation as a distinct portion of the lesson.

For specimen of explanations see the end of the lesson.

F. Continuation and end of the Lesson.

(*a*) After the first half of the subject matter has been read and explained, the remaining half may be taken in the same manner.

(*b*) At the end of each stage of the lesson a revision of the chief points taught should include (a) new words, their spelling and meaning; (b) any passages where special difficulty of pronunciation or expression have been encountered.

(*c*) Close the lesson by a general review, in a conversational form, of the subject matter.

* *These Notes are fuller than those of ordinary MS. Notes. The plan may be followed whilst the amount of matter under each heading is lessened.*

WORDS AND THEIR MEANINGS.

1. Perfect repose:

Water with a smooth surface.

2. Mechanical erosion:

The wearing away of rocks by the action of waves, breakers, and running water. If the class have any knowledge of chemical action, the destruction of rocks by the process of solution may be mentioned for the purpose of contrast.

3. Absolutely at rest.

Appeal to the knowledge children have of the still surface of a pool of water on a calm day and contrast with the ordinary surface of the sea.

3. The mechanical disturbance of the air finding its reflex on the surface of water:

Wind produces similar movements to its own on the surface of the water.

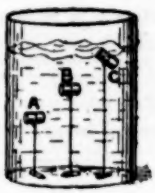
4. Ripple, wave, breaker, crest and trough:

Each word is explained by the accompanying sketch **Leeward** is the side of the wave away from the wind.

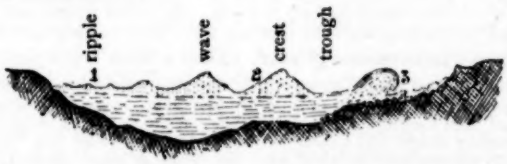
MODE OF EXPLANATION.

Show diagram with surface of water undisturbed by winds.

The diagram below shows the wearing of rocks at A by the action of water. This action is continued along the bottom as far as B.



Blow across a vessel with corks at different depths; the cork on the surface moves with the disturbance of the surface water.



Model Answers to Pupil Teacher Examination Papers.

21st April, 1888.

(Continued from June No. of PRACTICAL TEACHER.)

END OF FIRST YEAR.

Geography.

(Answer three questions only.)

MALES AND FEMALES.

1. Describe as fully as you can *one* of these rivers:—The Thames, the Shannon, the St. Lawrence; and name its source, the chief towns on its banks, and its tributaries.

2. Draw a map of the East Coast of England, marking the boundaries of the counties which adjoin the sea on that side, their ports, and chief towns.

3. What do you know of the following places:—Berwick, Torquay, Yarmouth, Wakefield, Brisbane, Ottawa, Melbourne, St. John's?

4. Explain the difference between a *group* and a *chain* of mountains, and illustrate your answer by examples.

(1) The Thames is the chief commercial river of England and of the world. It rises in the Cotswold Hills, in Gloucestershire, not far from the basin of the Severn, and flows generally in an easterly direction for 215 miles to the North Sea, emptying itself by a wide estuary. Its tributaries are, on the left bank, Windrush, Evenlode, Thame, Colne, Brent, Lea, and Roding; and on the right bank, Kennet, Loddon, Wey, Mole, Darent, and Medway. Of these the Medway is the most important. It separates Berkshire from Oxford and Buckingham, Surrey from Middlesex, and Kent from Essex. As the sources of the stream—the Leck, Colne, Charne, and Isis, four small streams—are only slightly elevated, its course is slow, and after heavy rains or quickly melted snow it often overflows its banks in its higher reaches. The district through which it flows is very fertile, and the whole course is renowned for its beauty. The chief towns on its banks are Oxford, Reading, Eton, Windsor, Richmond, Kingston, London, Chatham (Medway), Gravesend. It is navigable for the largest merchant vessels for 40 miles from its mouth, and for barges almost throughout its course, which at Teddington, 60 miles from the sea, is obstructed by locks.

(3) *Berwick:* an ancient border town, at the mouth of the River Tweed, often during the feuds between Scotland and England the scene of great strife; walls and fortifications still in existence; now assigned to Northumberland, and being a quiet market town of 14,000 inhabitants; a small port.

Torquay: situated on the beautiful Torbay, in Devonshire; sheltered from north and east; and enjoys a delightful climate, making it a suitable resort for invalids. About 25,000 inhabitants.

Yarmouth: at the mouth of the Yare, on the coast of Norfolk; celebrated for its herring fisheries. It has 35,000 inhabitants.

Wakefield: a woollen manufacturing town in the West Riding of Yorkshire, on the Calder, about nine miles from Leeds; has lately been created the seat of a bishop's see.

Brisbane: on the River Brisbane, in the south-east of Queensland, of which it is the capital and chief port. 50,000 inhabitants.

Ottawa: the capital of the Dominion of Canada, on the River Ottawa; the seat of government and the centre of the lumber trade. Population 30,000.

Melbourne: the capital of Victoria, Australia, at the mouth of the Yarra Yarra; the largest city, and one of the chief manufacturing towns and ports of the continent. 300,000 inhabitants.

St. John's: the chief town of Newfoundland, on the south-east coast; strongly fortified, with an extensive trade in fish. 250,000 inhabitants.

(4) A *group* of mountains consists of a cluster of mountains whose bases are united, but are not in the same direction, the breadth of the mountain region being as great as its length, as the Cumbrian Group. A *range* of mountains is a series having their bases united and their axes or lines of elevation continuous over a considerable extent of country, as the Pennine Range.

History.

MALES AND FEMALES.

(*Answer two questions only.*)

1. What do you know about the Mission of S. Augustine, and the introduction of Christianity into England?

2. What historical events are associated with the names of these places:—Athelney, Jarrow, Whitby, Canterbury, Glastonbury, Stamford Bridge, Ethandune (*or* Edington)?

3. Say what you know about the divisions of the country, and the principal events, in the reign of Alfred the Great.

(1) Gregory, a monk of Rome, had been constrained to attempt to Christianise England, but was prevented. When he became Pope, he sent Augustine with forty companions on the mission. They landed in Kent in 597 at Ebbsfleet. Ethelbert the king of that division was the most powerful prince in Southern England. He had married Bertha the Christian daughter of one of the Frankish kings in Northern Gaul, and he allowed to her the free exercise of her religion, although himself a heathen. He consented to receive Augustine, and hear what he had to say. This he did in the open air where the spells and enchantments which the strangers might use would, as he supposed, have less power. He was favourably impressed and gave them a house in Canterbury, near which they built a church, Augustine becoming first Archbishop after Ethelbert's conversion which soon took place. The king's example was followed by most of his people, and by 604 there were three sees in the S.E. of England.

(2) *Athelney.*—The retreat of Alfred the Great after his defeat by the Danes in 878.

Jarrow.—The residence of the venerable Bede who wrote here an Ecclesiastical History of England.

Whitby.—The seat of a famous abbey, with St. Hilda as its abbess, the residence of Caedmon the poet; the holding of a Synod in 664, at which Oswy the king of Northumbria decided in favour of the Roman time of celebrating Easter and other points of difference between the northern and southern teachers of Christianity.

Canterbury.—First Archbishopric of England; residence of Augustine the introducer of Christianity from Rome.

Glastonbury.—The scene of the chief events in Dunstan's life.

Stamford Bridge.—Battle between Harold and his brother Tostig, the abettor of Harold Hardrada, King of Norway.

Ethandune.—Defeat of Guthrum the Dane by Alfred the Great, leading to the Treaty of Wedmore.

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Make and stitch a band (four inches in length). Make two different-shaped buttonholes.

END OF SECOND YEAR.

MALES AND FEMALES.

Geography.

(*Answer three questions only, including the last, if you can.*)

1. Name the principal divisions of British India, and say what you know about one of them.

2. Draw an outline map of Italy, *or* of Spain and Portugal, and show in it the courses of three rivers, and the positions of six important towns.

3. Name the boundaries, chief imports and exports, and the principal towns and rivers, of Russia in Europe.

4. Say what you know about each of the following:—Dijon, Florence, Granada, Nuremburg, Delhi, The Hoogly, and The Deccan.

5. What is the difference of time between London and a place whose longitude is 25° E.? Account for this difference, and give the latitude and longitude of London and three other places.

(1) The principal divisions of India are—(1) The territories directly governed by the British; (2) Tributary States; (3) Independent States; (4) French and Portuguese Possessions.

The British possessions were formerly divided into three presidencies—Bengal, Bombay and Madras, but for purposes of Government the Bengal presidency is now sub-divided, and the groups of provinces are placed under:—(1) The Governor General; (2) The Lieut. Governor of Bengal; (3) Lieut. Gov. of N.W. Provinces; (4) Lieut. Gov. of Punjaub; (5) Chief Commissioner of Central Provinces; (6) Chief Com. of Burmah; (7) Governor of Bombay; (8) Governor of Madras.

Each of these Governors has the charge of the British States and the feudatory states grouped about them. Thus the Governor of Bombay presides over the affairs of the Deccan, Concan, Gujerat and Sind, belonging to England, and the feudatory states—Gincowar's Territory, Kattywar States, Cutch Kolapore and others, occupying the whole of the western shores of the peninsula watered by the Indus, Nerbudda, and Tapty, and having the large town of Bombay as its seat of Government.

(3) *Boundaries.*—North by the Arctic Ocean; East by the Petchora, Ural Mountains and Ural River; South by the Caucasus Mountains, the Black Sea; West by Roumania, Austria, Germany, Baltic Sea Sweden.

Imports.—Coal, manufactured iron, steel, woollen and cotton goods, cotton yarn, sugar, colonial produce generally, indigo.

Exports.—Corn, flax, hemp, timber, oil, leather, tar, pitch, turpentine, potash, copper, tallow, wool, and furs.

Towns.—St. Petersburg, Moscow, Warsaw, Odessa, Riga, Kief, Astrakhan, Cronstadt, Nijni-Novgorod, Taganroy, Archangel, Tula, Vilna, Saratof.

Rivers.—Northern Dwina, Petchora, Western Dwina, Neva, Vistula, Volga, Don, Dnieper, Dniester, Ural.

(4) *Dijon.*—A town of 40,000 inhabitants in France, at the confluence of the Onche and Suzon; chief depôt for the sale of Bergundy Wines.

Florence.—On the Arno in Central Italy, celebrated for its university, some of the finest art galleries in the world. Michael Angelo and Dante were natives; 170,000 inhabitants.

Granada.—The old Moorish capital of Spain, on a tributary of the Guadalquiver; palace of the Alhambra; 70,000 inhabitants.

Nuremburg.—In Bavaria, on the Pegnitz; noted for watches, clocks, and jewellery; birthplace of Albert Durer; 90,000 inhabitants.

Delhi.—The former capital of the Great Mogul Empire, situated on the river Jumna, well fortified and surrounded by walls; siege in 1857; population 150,000.

The Hoogly.—The principal of the branches into which the Ganges divides at its mouth; Calcutta, capital of India, stands on its banks.

The Deccan.—The part of the peninsula of India bounded by the Nerbudda on the N., the Kistnah on the S., and the Ghauts on the E. and W. It forms a large plateau across which flows the Godavery.

(5) The time of London is one hour and forty minutes behind that of a place 25° E.

The earth takes 24 hours to perform a revolution round the sun. It thus travels at the rate of 15° per hour (the circumference being 360°) or 1° in 4 minutes. As the earth revolves from W. to E. the meridians E. of London come under the sun before that of London itself, and 25 × 4′ = 100 minutes the difference of time.

London,	Lat. 51°	31′ N.	Long.	0°	5′ W.
Paris,	,, 48°	50′ N.	,,	2°	21′ E.
Rome,	,, 41°	54′ N.	,,	12°	30′ E.
Constantinople,	,, 41°	1′ N.	,,	28°	58′ E.

History.

(*Answer three of these questions.*)

MALES AND FEMALES.

1. Who were the most important personages, and what were the most important events, in the time of Edward III.?

2. What happened at Evesham, Nevil's Cross, Crecy, Agincourt, Runnymede, Bosworth, and St. Albans, respectively?

3. Mention, with exact dates, eight of the most memorable events which occurred in the Tudor period.

4. Tell what you know about these persons:—Warwick (the king-maker), Drake, Chaucer, De Montfort, Sir Philip Sidney, Joan of Arc, Wyclif, and Thomas Cromwell.

(1) The chief personages in the time of Edward III. were the king himself, his queen, Philippa of Hainault, John Baliol, and Robert Bruce, Philip of Valois, and his son John, David II., King of Scotland, and Edward Baliol, the Black Prince, Pedro, King of Spain, Isabella, the Queen Mother, and Mortimer, Earl of March.

The chief events of the reign were the treaty of peace with Robert Bruce, the overthrow of the power of Mortimer and Isabella, the battle of Halidon Hill, 1333, the beginning of the wars with France, 1338, Battle of Sluys, 1340, Battle of Crecy, 1346, and Nevil's Cross, 1346, the ravages of the Black Death, Battle of Poictiers, 1356, Treaty of Bretigny, 1360, the division of Parliament into two Houses.

(2) *Evesham:* Battle in which Simon de Montfort was defeated and slain by Prince Edward, afterwards Edward I. 1264, A.D.

Nevil's Cross: David II., of Scotland, defeated and taken prisoner by Queen Philippa, wife of Edward III. 1346. (Oct. 17).

Crecy: Defeat of Philip of Valois by Edward III. and the Black Prince. 1346. (Aug. 26).

Agincourt: Battle in which Henry V. defeated the French in 1415. (St. Crispin's Day, Oct. 23).

Runnymede: The signing of Magna Charta by King John. 1215. (June 15).

Bosworth: Battle in which Richard III. was defeated by Henry, Earl of Richmond, afterwards Henry VII. 1485. (Aug. 15).

St. Albans: Battles between Houses of York and Lancaster, 1455; the Lancastrians defeated and Henry taken prisoner, 1461—Margaret defeated Warwick, and released the King.

(3) 1. Discovery of the New World by Christopher Columbus 1492
And Cabot, in 1497
2. Field of Cloth of Gold 1520
3. Loss of Calais 1554
4. Reformation in Germany and England:—
Luther published his 95 propositions ... 1517
Henry became Defender of Faith ... 1521
Final breach between England and Rome... 1535
Marian Persecution 1555–58
Establishment of Church of England... 1562
5. Drake's voyage round the world 1577–80
6. Execution of Mary, Queen of Scots ... 1587
7. Armada defeated 1588
8. Establishment of East India Company ... 1600

(4) *Earl of Warwick* first joined the cause of the Duke of York, helping to gain the battle of St. Albans, taking Henry VI. prisoner. He was also victorious at Blorcheath and Northampton, but was defeated by Margaret at the second battle of St. Albans, 1461. He quarrelled with Edward and joined Margaret. He was killed at Barnet in 1471.

Drake, Sir Francis, one of the most famous naval commanders of the reign of Elizabeth, was employed first against the Spaniards in the New World (1570-2), and destroyed their fleet at Cadiz, 1587, assisted in the destruction of the Armada, 1588. He had previously sailed round the world, being the first Englishman to do this. He died in 1595 in S. America.

Chaucer, Geoffrey (1328—1400), the first great English poet, wrote the Canterbury Tales. He lived at the courts of Edward III. and Richard II.

De Montfort, Simon, Earl of Leicester, brother-in-law of Henry III., with whom he quarrelled. He led the barons in their revolt against the King, and their attempts to reform the State. He defeated the King at Lewes, 1264, but was himself defeated and killed at Evesham in the following year.

Sir Philip Sidney, a young accomplished soldier, who fell at the battle of Zutphen, in the Netherlands, in 1586. He wrote a prose romance called 'Arcadia.'

Joan of Arc, a peasant girl, who by professing inspiration from heaven, put new life into the French, and rescued France from the hands of the English, 1429—1431. She was burned as a witch by the English at Rouen.

Wyclif, John, Professor of Divinity at Balliol College, Oxford, and rector of Lutterworth. He preached against the errors of the Church of Rome and translated the Bible into English. He was the first English Reformer. He died in 1384.

Thomas Cromwell was at first a clerk in Antwerp, but became a lawyer in England, and a friend and assistant to Wolsey, by whom he was recommended to Henry VIII. On the death of Wolsey he became one of Henry's chief advisers, assisted in the destruction of the monasteries, and afterwards incurred the King's displeasure. He was executed for high treason in 1540.

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. What use could you make of a threefold ruling of the lines, on a child's slate and on the teacher's blackboard, in order to show more clearly the forms and proportions of letters, and the mode of joining them? As an example, take the word *cathedral*, and write it in large hand, after making three parallel lines for the copy.

2. In using pattern reading, so as to give the correct tone and expression, say whether you would employ it at the beginning or the end of your reading lesson, and give your reasons.

3. Give eight examples of useful mental exercises on number for young children, the highest number not to exceed 30.

(1) The blackboard would be ruled in the same way as the slate. Then attention would be called to each letter as it was written on the blackboard, care being taken to show that each up stroke of a letter joined the following letter at the middle line, with the exception of the one between the *t* and the *h* which joins at the top line. The commencement of the *o* in the *a's* and the *d* would also be made at the middle line.

[NOTE.—As directed the word *cathedral* would be written and the above points indicated.]

(2) It would all depend upon the nature of the subject, and the age of the class.

Young children need a pattern at the beginning of a lesson. They have not been taught to read, and by giving a pattern at the beginning, they form habits of correct expression, enunciation, and emphasis.

With elder children the pattern will more often be best when the lesson has been examined and is understood. In some lessons the want of tone and expression may be felt only in a few sentences of the lesson. Then the pattern should be given when the faults are found.

(3) Add 19 and 11 and take away 10. How many girls could get 6 oranges each out of 30? How many apples would each of 5 girls get out of 25? Into how many heaps could I put 24 coins, 8 in each heap? 15 girls got 2d. each given to them, how many shillings was that? How much less than 3s. would that be? Ten girls each pay 2d. per week school money, how many more pennies would make 2s.? Which is most, 29 pence or 2s. 5d.?

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Join by a sew and fell seam two pieces of calico, insert a gusset as for the side of a man's shirt.

END OF THIRD YEAR.

Geography.

MALES AND FEMALES.

(*Answer three questions only, including the last, if you can.*)

1. Say what you know about China, as regards its people, productions, industries, and chief places of interest.

2. Draw a map of the Northern part of Africa, so far as to show the States bordering on the Mediterranean. Say also how they are respectively governed, and by whom.

3. Say what you know about: Borneo, Aden, Burma, Afghanistan, the Gold Coast, Cairo, Bechuana Land, Abyssinia.

4. What are the causes of winds? What is meant respectively by Variable winds, Periodical winds, Trade winds? How may Trade winds be accounted for?

(1) The people of China are nearly four hundred millions in number. They are yellow skinned with black hair which is allowed by both sexes to grow to a great length behind. They are flat featured and their eyes are diagonally set in their sockets. They are an industrious people, placid and affable in disposition, but artful and cunning; the ruling classes are intelligent but unprincipled. The murder of infants is said to be common. Their ideas of female beauty causes them to deform the feet of female children. They are very much averse to foreigners and until lately held little intercourse with the outside world.

The productions of China include tea, silk, and rice; the orange, tamarind and mulberry tree are grown; gold, silver, quicksilver, zinc and coal are the chief minerals; and a fine kind of clay is manufactured into the best of porcelain.

The people are very largely engaged in agriculture, which has been brought to a great degree of perfection, while silk, porcelain, cotton and paper employ large numbers.

Among the objects of interest are the Great Wall on the northern frontier, the Imperial Canal 700 miles long, the pagodas, palaces, and most of the large towns, many of which are walled.

(2) *Egypt* is governed by a Khedive whose power is absolute although he is nominally subject and pays tribute to Turkey. The title is hereditary. Tewfik Pasha is the reigning sovereign.

Tripoli, a villayet or province of the Ottoman Empire under the governor generalship of a pasha (Admed Rassim). The government of all Ottaman countries is an absolute despotism.

Tunis, nominally under a Bey, but really a dependency of France, the power being in the hands of a French Resident who collects the taxes and pays the Bey a subsidy.

Algeria, a French province under a governor general.

Morocco, an absolute monarchy under a sultan (Mulai Hassan).

(3) *Borneo*, next to Australia, is the largest island in the world, and lies directly south of the equator and east of Sumatra, and the Malay Peninsula. It is divided into a number of petty states, a British Trading Co. having power in the north. The chief ruler is a sultan. Its capital is Bruni on the N.W. coast.

Aden, a strong seaport of Yemen, at the entrance to the Red Sea. Of importance as a coaling station to the British, to whom it belongs. Perim, a small island in the strait, is also under the same governor as Aden.

Burma, a state of the peninsula of Further India, about twice the size of the British Isles, watered by the Irrawaddy and its tributaries, partially ceded to Britain in 1824 and 1856. The remainder occupied in 1886.

Afghanistan occupies a position to the N.W. of India, with Beloochistan on the S., Turkestan on the N., and Persia on the W., consists of a series of high valleys and tablelands, occupied by a rude race of mountaineers, under an Ameer or King.

Gold Coast, a portion of the coast of Upper Guinea so called from its producing gold in small quantities; under British rule; Cape Coast Castle, Elmina and Accra being the chief settlements.

Bechuana Land, a large district north of the Gareep or Orange river in South Africa, now under British protection.

Abyssinia, a country of North Africa, situated south of Nubia on the highlands S.W. of the Red Sea. Consists of a series of plateaus with high mountain ranges, the highest being about 15,000 ft. Capital, Senaar.

(4) Winds are caused by the variation of the temperature of the atmosphere. If the atmosphere becomes heated it expands, becomes lighter and ascends. To restore the equilibrium, the cold air rushes to fill up the space, and winds are caused.

Variable Winds are inconstant in their action, and do not blow at any stated periods or in any particular direction.

Periodical Winds are such as blow at stated periods and in certain directions.

Trade Winds are periodical winds which blow on either side of the equator and were so called because of their influence on ships engaged in trade. Trade winds are caused by the heating of the atmosphere in the region of the equator. A constant stream of air blows from the N. and S. to occupy the place of the light expanded air near the equator. Owing however to the rapidity of the motion of the earth at the equator the winds are as it were left behind, and thus become N.E. and S.E. winds.

History.

(*Answer three questions only.*)

MALES AND FEMALES.

1. What do you know about these persons respectively:—Bacon, Hampden, Milton, Monk, Buckingham, Monmouth and Marlborough?

2. Recount in order, with dates, the chief incidents of the war between Charles and his Parliament.

3. Name the chief events in the reign of George II., and say what made the last year of that reign especially memorable.

4. Say what you know about the Slave Trade and its abolition.

(1) *Francis Bacon*, Lord Chancellor, Baron Verulam, and Viscount St. Albans, was a friend of the Earl of Essex, by whom he was introduced to James I.; assisted James by his advice in the management of Parliament; was made Lord Chancellor, but was impeached, convicted of corruption, and degraded from his office. He wrote a number of philosophical works, the chief being his 'Novum Organum.' Died in 1626.

John Hampden, one of the chief supporters of the Parliamentary party during the Civil War of 1642. He resisted the illegal levying of ship-money, was tried and compelled to pay. Was one of the five members whom Charles attempted to seize in the House of Commons. He raised a Buckinghamshire regiment and reinforced the Parliamentary army after the defeat of Edgehill. Was killed in the engagement at Chalgrove Field in 1643.

John Milton, Latin secretary to Oliver Cromwell during the Commonwealth; the greatest modern epic writer; chief works —'Paradise Lost,' and 'Paradise Regained,' 'Comus,' 'Lycidas,' 'Samson Agonistes,' 'L'Allegro' and 'Il Penseroso.' Died 1674.

General Monk was employed by Cromwell to reduce the Royalists in Scotland. After Cromwell's death, effected the restoration of Charles II., whom he received at Dover. Was created Duke of Albemarle; afterwards commanded the fleet, and was employed against the Dutch.

Buckingham, Duke of, George Villiers, gained the affection of James I. and was rapidly promoted; went with Prince Charles to bring home the Infanta from Spain; disgusted the Spaniards and the match was broken off; fitted out an expedition against the Protestants of Rochelle; was impeached by the Commons; assassinated by a man named Felton, at Portsmouth, 1627.

Monmouth was a natural son of Charles II. He defeated the Covenanters at the battle of Bothwell Bing, intrigued against the King, but was pardoned; he afterwards invaded England (1685), and was defeated at Sedgemoor, taken prisoner and executed.

Marlborough, Duke of, joined the Prince of Orange, whose confidence he gained, and by whom he was employed in Ireland. In Anne's reign he gained victories at Ramilies, Oudenarde, Malplaquet, and Blenheim; was afterwards impeached and disgraced.

(2) Charles attempted to seize the five members, who escaped 1642
Charles fled to York ... ... ,,
Commons demanded that the King should give up command of the army ... ... ,,
Attempt to seize Hull ... ... ,,
Royal Standard raised at Nottingham (Aug. 25) ,,
Battle of Edgehill (indecisive)... ... ... ,,
Charles wintered at Oxford ... ...
Battles of Chalgrove Field (Hampden wounded), Atherton Moor (Royalists victorious), Siege of Gloucester, Battle of Newbury (Parliamentarians victorious) ... 1643
Battle of Marston Moor (Cromwell victorious) 1644
Second battle of Newbury (indecisive) ... ,,
Battle of Naseby (Charles routed) 1645
(This battle ended the first Civil War).
Insurrection in favour of Charles 1648
Cromwell defeated the Scotch army at Preston ,,
Charles was delivered up to the Parliament, tried and executed 1649
Walpole wanted to pass an Excise Bill ... 1733
Porteous riots in Edinburgh 1736

(3) War declared against Spain 1739
Founding of Methodist Societies ... ... ,,
War of the Pragmatic Succession 1741–45
Battle of Dettingen 1743
Young Pretender's rebellion 1745
Battle of Falkirk 1746
Seven Years' War 1756–63
The last year of the reign is made memorable by the capture of Quebec, and the total destruction of the French power in North America.

(4) The slave trade was begun by the Portuguese in 1481. Since that time it has devastated a large part of the East and West of Africa, and was carried on for nearly 250 years. Sir John Hawkins began the slave trade in England in 1562, and it grew so extensively that in 1786 England employed 150 ships and carried off above 40,000 slaves. Then a society was formed for the suppression of the slave trade by Clarkson, Wilberforce, and Dilwyn. The question was debated in Parliament in 1787, 1792, and 1798, when Mr. Wilberforce's motion for its abolition was defeated by a small majority. Finally it was abolished in 1807. Since that time England has employed her ships to put down the slave trade; slavery itself has been abolished in the British possessions and the United States; but it is still practised, and the slave trade is still carried on in Africa.

Teaching.

(Answer two questions only.)

1. Write out notes of a lesson on *one* of these subjects :—(*a*), the sea; (*b*, for Infants), a Farm Yard.

2. Show how you would give to children of the Third Standard, a first lesson on the different uses of adjectives and adverbs. Say what illustrations you would use, and whether you would use them at the beginning or towards the end of your lesson.

3. (*For Infants.*) Say how you could, either by paper folding or by simple drawing, make the properties of the square visible to young children, and explain what are the uses of such a lesson.

4. Sketch out a plan of the village or part of the town in which your schoolroom is situated, and explain how you could make such a sketch useful as a first lesson on geography, and on the meaning of a map.

THE SEA.

(1) (*a*) *What we mean by the Sea.*—Ascertain if any of the children have been to the seaside. Get their ideas of the sea, and, if possible, the definition that we mean the whole body of salt water which covers three-fourths of the surface of the earth.

(*b*) *Area and Divisions.*—(Use map of the world); show area to be ¾ of whole surface, 145,000,000 sq. miles nearly. Division: Atlantic, Pacific, Indian, Arctic, and Antarctic. Compare sizes and shapes of these on the map.

(*c*) *Remarkable Features* connected with the sea:

1. *Saltness*, caused by beds of salt in bottom of the ocean. Prop. 3½ per cent.
2. *Colour*, open sea, blue; shallow water, green; in mid-ocean, black; Red Sea, reddish; Gulf of Greece, white; China Sea, yellow.
3. *Restlessness*, tides, currents, waves. (These can only be mentioned, not fully treated.)
4. *Temperature* changes on the depth; mention Gulf stream; freezing point lower than fresh water.

(*d*) *Value and Uses of the Sea:*

1. Moderates the temperature (show how).
2. Good means of communication.
3. Source of rain, vapour, clouds, &c.
4. Supplies us with food and pleasure.

(2) I should place some article before the children at the *beginning* of the lesson, and, by questioning, get from them the words which would describe the article. This I should repeat with other articles, and show that there are words which describe nouns, that is *adjectives*.

Then I should show specimens of writing, and some would tell me how the writing had been done. From this I should show that there were words which qualified words denoting action (verbs). These words are *adverbs*.

Having done this I should put a list of nouns on the black board, getting adjectives to qualify them; then a list of verbs with adverbs to qualify. Then a miscellaneous list; and, lastly, sentences with adjectives and adverbs required.

(3) As a first illustration, paper folding would be the best for showing the properties of a square. By folding a square piece of paper before a class the children might see first that the opposite sides were alike, and that the angles were alike, then that the contiguous sides were the same, that halves of opposite sides were the same. Then it might be shown that to be a square one side must be at right angles to another. A square should then be drawn on the blackboard, as a further illustration.

The giving of such a lesson is of practical value in developing the faculties of observation. If children also have papers given to them or pencils to draw, of imitation also.

(4) (*Latter part.*) A plan of the schoolroom enables a teacher to show the relationship between lines of various lengths, to give an idea of proportion, and to show generally that large surfaces may be represented by smaller ones, the shapes being the same. Direction also may be taught by it; the meaning of a plan is better understood by a sketch than by a verbal description. From the plan we can proceed to the village, the town, the county, a country, a continent, and the world.

Geography.

MALES AND FEMALES.

(Answer three questions only, including the fourth, if you can.)

1. Name the planets, and give any particulars you can respecting their sizes, their distances from the sun, and the periods of their revolution.

2. What countries and parts of countries are included in the south temperate zone? Illustrate your answer by a map.

3. Give such particulars as you can respecting the following places:—Washington, Buenos Ayres, Tahiti, Mecca, Nice, Adelaide, Munich, the Crimea.

4. Explain, as to a class of children, the meaning of these terms:—*A tidal river, spring-tide, high water, neap-tide.*

(1) 1. *Mercury*, 36 million miles from the sun; revolves in 88 of our days. Its diameter is about 3,000 miles.

2. *Venus*, called also Vesper and Lucifer, 7,550 miles in diameter. Revolves round the sun in 224 days, at a distance of 67 millions of miles.

3. *The Earth*, nearly 8,000 miles in diameter; 365 days; mean distance, 93 million miles.

4. *Mars*, mean distance 139 million miles, 686 days in revolution; about 4,000 miles in polar, 4,900 equatorial diameter.

(The above are the interior planets. The asteroids intervene between Mars and Jupiter.)

5. *Jupiter*, mean distance, 479 million miles; 83,000 miles in polar, 88,000 equatorial diameter; revolution 11 yrs. 10 ms. It is 1,400 times the size of the earth.

Saturn, mean distance 870 million miles; 65,000 miles and 72,000 miles polar and equatorial diameters; revolution 30 years.

Uranus, 1,753 million miles from the sun; diameter, 32,000 miles, and period of revolution 84 years.

Neptune, 2,746 million miles from the sun; 37,000 miles in diameter, and period of revolution 160 years.

(2) In South America: Argentine Republic, or La Plata, Paraguay, Uruguay, Chili, Patagonia, and part of Brazil.
In Africa: Cape Colony, Natal, and the Transvaal, part of Madagascar.
In Australia: parts of West Australia, South Australia, and Queensland; New South Wales, Victoria, New Zealand.

(3) *Washington*, on the Potomac, in the district of Columbia, named after George Washington; seat of Government of the United States; fine buildings, the Capitol and White House. The name is also given to a territory in the N.W., and to some 100 counties and towns of the States.

Buenos Ayres, capital of one of the States of the same name of the Argentine Republic, founded by the Spaniards, well fortified, has great trade, and is one of the largest cities of S. America.

Tahiti, the largest of the Society Islands in the S. Pacific, belongs to France; grows bread-fruit, yams, cocoa-nuts, arrow-root, &c. Papiete is its chief town.

Mecca, capital of Hedjaz, in Arabia, situated in a narrow valley debouching on the Red Sea. The birthplace of Mahomet in 569; the holy city of the Mussulmans; has a splendid temple with the shrine of the prophet. Visited yearly by many pilgrims.

Nice, city and seaport of France, beautifully situated on the Mediterranean, in the department of the Maritime Alps. Much frequented for its mild climate.

Adelaide, capital of W. Australia, on the Torrens River, near the St. Vincent Gulf; named in honour of Queen Adelaide, consort of William IV.

Munich, on the Isar, capital of Bavaria; has many elegant buildings, libraries, collections of sculpture, university. 200,000 inhabitants.

The Crimea, a peninsula in the S. of Russia, stretching into the Black Sea; joined to the mainland by the isthmus of Perekop; southern part very fertile; noted as the scene of the war with Russia, 1854—55.

(4) (*a*) *A tidal river* is one up which the tide flows twice a day.

(*b*) *Spring tide* is the tide course when the sun, moon, and earth are in a straight line. As the sun and the moon both attract the waters of the earth, their influence is thus united, and a high tide, called spring tide, is produced.

(*c*) *High water* is the name given to the highest point reached by the tide just before the tide begins to ebb.

(*d*) *Neap tide* is the low tide which results from the attraction of the sun and moon being exerted in directions at right angles to each other.

(Diagrams would be drawn to illustrate *b* and *d*, and instances given of *a*.)

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Make up a square of calico (nine inches) in the shape of a working woman's apron, showing the following stitches, viz.: Hemming, sewing, and gathering or pleating. Sew on tapes.

END OF FOURTH YEAR.

History.

MALES AND FEMALES.

(*Answer three question only.*)

1. State in detail the reasons which make the following places memorable in English History:—Plassy, Chalgrove Field, Glencoe, Dettingen, Quatre Bras, Lexington, Londonderry, Sedgemoor.

2. Give in chronological order, with dates, the chief events of the period from 1801 to 1820.

3. What additions were made to our Dependencies and Colonial Possessions in the 18th century?

4. Name three of the most famous writers, and three of the most famous statesmen, in each of the following reigns:—(*a*) Elizabeth, (*b*) Anne, (*c*) Victoria.

(1) *Plassy:* battle fought between the British under Clive, and the Hindoos under Sarajah Dowlah, 23rd June, 1757. The nabob with 68,000 men was defeated by the English with 1000 and 2000 sepoys. The victory laid the foundation of our empire in India.

Chalgrove Field: memorable as being the place where John Hampden, one of the leaders of the Parliamentary Army, was mortally wounded on 18th June, 1643.

Glencoe: memorable as the scene of the massacre of the clan McDonald, whose chief had not submitted to William III. in sufficient time. Over 60 men were killed, 13th February, 1692, and many women and children perished in the snow.

Dettingen: George II. defeated the French on June 16, 1743, in the war of the Pragmatic Succession. It was the last battle in which an English sovereign fought in person.

Quatre Bras: on the 16th June Marshal Ney was repulsed by the British; the Duke of Brunswick was killed; two days later Napoleon was finally defeated.

Lexington: the actual beginning of the American War of Independence took place here on April 19th, 1775, a number of American riflemen attacking a detachment of British soldiers who were about to seize some stores of war.

Londonderry: noted for its siege by the Irish Catholics after the Revolution in 1688. For many months the Protestants held the town for William III., suffering great hardships, but were finally relieved in 1861.

Sedgemoor: defeat of the Duke of Monmouth who had landed in Dorset with the expectation of being assisted to the throne, June, 1685. It was the last battle fought on English ground.

(2) Legislative Union of Ireland and Great Britain ... 1801.
Battle of Copenhagen ... ... ,,
,, Alexandria ... ... ,,
Peace of Amiens ... ... 1802.
Renewal of War with France ... ... 1803.
Pitt again Prime Minister ... ... 1804.
Crowning of Napoleon I. ... ... 1805.
Battle of Trafalgar ... ... ,,
Peninsular War ... ... 1808—1814.
Victories at Vimiera, 1808, Corunna, 1809, Talavera, 1809, Ciudad Rodrigo, Badajos, 1812, Vittoria, 1813.
Walcheren Expedition ... ... 1809.
Napoleon confined in Elba ... ... 1814.
Escape, and Battles of Quatre Bras and Waterloo—Banishment of Napoleon ... ... 1815.
Bombardment of Algiers ... ... 1816.
Manchester Massacre ... ... 1819.
Cato Street Conspiracy ... ... 1820.

(3) Canada, Prince Edward Island capitulated; St. Vincent, Cape Breton, Dominica, and Grenada were ceded; the settlement of New Brunswick was effected; Gibraltar was captured; New S. Wales, Sierra Leone, and Prince of Wales Is. were settled; the power of England was very largely increased in India.

(4) *Elizabeth.*
Writers: Spencer, Shakespeare, and Bacon.
Statesmen: Lord Burleigh, Leicester, and Essex.
Anne.
Writers: Addison, Steele, Sir Isaac Newton.
Statesmen: Marlborough, Godolphin, Harley, St. John.
Victoria.
Writers: Carlisle, Tennyson, Macaulay.
Statesmen: Gladstone, Disraeli, Palmerston.

Teaching.

MALES AND FEMALES.

(*Answer two questions only.*)

1. Write out a sketch of a lesson on *one* of these subjects, and state what illustrations you would require to make such a lesson effective:—

(*a*) The Herring Fishery.
(*b*) The Manufacture of Steel.
(*c*) The Parts of a Simple Sentence.
(*d*) *For Infants.* A Coal Mine.
(*e*) *For Infants.* The Colours of the Rainbow.

2. How can spelling be best learned, orally or by writing, or by any other plan? Say how you can secure the right spelling of the difficult words in a reading lesson, without interrupting the reading too much, or making the exercise uninteresting.

3. Classify the letters of the English alphabet according to the difficulty of writing them, and the order in which they should be taught. Describe, also, the best way you know of *ruling* slates and copy-books for the younger children.

4. *For Infants.* Of the three simple manual employments—building, plaiting, and elementary drawing—which do you think most helpful in the education of a child, and why? Explain how you would use and vary the exercise you prefer.

(1) (*a*) Illustration and apparatus: small net, with floats and weights (made from corks and lead by teacher); picture of boat or fleet of boats; a herring. Blackboard and chalk.

(*b*) Some articles made of steel, iron ore, steel in various stages of manufacture; picture of furnace, &c., in steel works. Blackboard, &c.

(*c*) Blackboard and chalk.

(*d*) Picture of a coal mine; safety lamp or picture; coal, blackboard, &c.

(*e*) Picture of a rainbow; threads of various colours and shades to arrange as for a rainbow; a prism.

(*a*) The Herring Fishery:

1. *Methods of catching Fish.*—Rod and line with hook, nets, spears. Herring caught by nets.

2. *Boats and Men.*—Describe fishing boat, broad of beam, black sails, well for fish; men, hardy, inured to danger, carrying long nets; little convenience for them.

3. *Localities, &c.*—Herring caught chiefly round British coasts (Yarmouth, Grimsby, N. Shields, Pell, the chief stations); swim in shoals; months of June to September.

4. *How caught.*—Boats go out chiefly at night; cast their nets, floats, and weights, keep them upright; fish caught in attempting to pass through the nets by gills; nets drawn up and thrown into well of boat, boats taken to shore, and nets cleared.

5. *Supply.*—Inexhaustible; affords employment to thousands; finds food, good and cheap, for many more.

(*d*) A Coal Mine (for Infants):

1. *Use of Coal,*—Refer to fire, need for it on cold day. How made and kept going. By coal chiefly. What is coal?

2. *Where found.*—Like black stone, but not found in quarries; men have to dig for it deep down in the earth, place called a mine.

3. *Parts of a Mine.*—Shaft (describe); seam of coal (illustrate by three books, black one in middle, also draw on blackboard); mine has streets crossing each other (draw); little railways.

4. *How Coal obtained.*—Men hew, blast with powder, coal falls, filled in tubs or waggons, drawn up in a cage by steam engine (show picture).

5. *Miners.*—Live a hard life under ground; no light but from a little lamp; work dangerous; should be thankful for their labour.

(2) (*a*) The best method of learning spelling is by a proper combination of oral and written work. Transcription is useful for accustoming the eye to make the words letter by letter. Oral spelling tests the memory; dictation both writing and memory. The rules upon which the spelling of words is based may also be given with good effect, such as those for doubling the final consonant, dropping or retaining the *e*, when the syllable *ing* is added. No one plan is suitable in every instance. (*b*) By having the words committed to memory and their meanings given before the reading lesson commences, or after it terminates. The former method is preferable.

(3) (*a*) (1) i, u, m, n, w, v.
(2) t, l, p, b, h.
(3) o, a, d, q, j, g.
(4) e, c, f.
(5) s, x, y, z, r, k.

(*b*) Slates. Double lines for the writing, with a heavier line to mark the height or depth of the letters. Squares for figures.

Copy books. Double lines for the writing, with a faint midline to show where the letters should be joined. Also lines deeper or of another colour, to show the height and depth of the long letters. An occasional line to mark the slant.

(4) Drawing is perhaps the best. It trains the eye and the hand, and necessitates close observation, and developes the faculty of imitation. It also assists in writing, and can be applied afterwards to a great variety of purposes.

I should use the blackboard largely, beginning with lines, horizontal, vertical, oblique; then I should combine these in various ways, making them of various lengths. I should build up every figure a little at a time, so that it would be easy for the children to follow and to imitate. I should apply these lines to different sorts of common objects.

Needlework.

GIRLS ONLY.

(*One hour allowed for this exercise.*)

Make the sleeve of a baby's night-gown, plain-stitch or feather-stitch the wristband.

—o—

Publications Received.

Bell, G., and Sons—
History and Geography Examination Papers. By C. H. Spence, M.A.
Livy, Book XXII. With Notes by the Rev. Launcelot Downing Dowdall, M.A.

Blackie and Son—
Euclid, Book III. By A. E. Layng, M.A.
Poynter's Drawing for the Standards, Nos. 25, 26, 27 and 28.
Sonntag's French Grammar. Part III.

Blackwood, W., and Sons—
Accent and Rhythm explained by the Law of Monopressures. Part I.

Cassell and Co.—
Cassell's Coloured Historical Wall Sheets.
First Elements of Experimental Geometry. By Paul Bert.

Chambers, W. and R.—
Recitations for Infants.

Curwen, J., and Sons—
The Musical Profession. By Henry Fisher, Mus.Doc.

Heywood, John—
Lamb's Tales from Shakspere. By A. Gardiner.
The Swiss Family Robinson. By A. Gardiner.
The Standard Arithmetic. Part II.
The New Graded Arithmetic. Part VI.
Horn's Geography. Parts 1 and 2.
Horn's Lessons in Grammar and Geography. Standard III.

Johnston, W. and A. K.—
Wall Map of England and Wales.

Longmans and Co.—
Rhetoric and Composition, Part II. By Alex. Bain, LL.D.
The Revised Latin Primer. By B. Hall Kennedy, D.D.
The Shorter Latin Primer. By B. Hall Kennedy, D.D.
The Standard of Value. By William Leighton Jordan.
Lessons in Elementary Mechanics. Stage 2. By W. H. Grieve.
A Treatise on Plane Trigonometry. By John Casey, LL.D., F.R.S.
Longmans' Commercial Mathematics.
Longmans' Test Cards in Mechanics. Stages 1, 2, and 3.

Macmillan and Co.—
Grimms' Kinder und Hausmärchen. By G. Eugène Fasnacht.
Elementary School Atlas. By J. Bartholomew, F.R.G.S.

Murby, Thomas—
Notabilia of Geography. By W. Blanchard.

Nelson, T., and Sons—
The Royal Standard Reader. Standard VI.: The Boy makes the Man.
Arithmetic Drill Sheets for Infants.

Smith, Elder and Co.—
The Cornhill Magazine. June.

Swan Sonnenschein and Co.—
British Reptiles and Batrachians. By Catherine C. Hopley.
The Cyclopædia of Education. Part V.
Girls' High School Series: Virgil's Æneid, Book I.
Hermann Paul's Principles of the History of Language. Translated by H. A. Strong, M.A., LL.D.

The Clarendon Press—
Johnson's Lives of the Poets: Milton. By C. H. Firth, M.A.
Xenophon, Cyropædia. Book I. By C. Bigg, D.D.
Xenophon, Anabasis. Book III. By T. Marshall, M.A.

The School Books Publishing Company—
An Elementary Treatise on Mensuration. By E. J. Henchie.

Trübner and Co.—
Sunlight.

Ward, Lock, and Co.—
Health in Schools and Workshops. By G. Black, M.B.

Waterlow and Sons—
Plotting; or, Graphic Mathematics. By Dr. R. Wormell.

Whittaker and Co.—
German Epic Tales: Die Nibelungen; Walther und Hildegund. Edited by C. Neuhaus.
Progressive German Reader. By Franz Lange.
Hey's Fabeln für Kinder. By Franz Lange. With Phonetic Introduction.
Nature Reader. No. 1. By J. McNair Wright.

Williams and Norgate—
Eugène's French Grammar.
French Composition. By Leon Delbos, M.A.
Scenes from the war in La Vendée. With Notes by C. Scudamore, M.A.
Victor Hugo's Notre-Dame de Paris. Vols. 1 and 2. With Notes by J. Boielle.
Cæsar, Book I. With Notes by A. M. Bell, M.A.

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents, who send questions for solution, would give (if possible) the required answer, and the source from which the question is obtained.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. ☞ When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher, Pilgrim Street, Ludgate Hill, London, E.C.*

General.

1. LEX.—There is the book you mention. It is not easy to procure. Write to the publisher and explain why you want it. Most likely a copy will be sent to you.

2. JOHN H. J.—Another article will appear on the subject you mention. If you have a teacher use Aue's 'German Grammar,' Chambers. If not, begin with 'German Principia,' Part I., and correct your exercises with the aid of the key.

3. LORD REVELFACH.—The back numbers and volumes of the PRACTICAL TEACHER contain just what you are asking for. From the first volume a large part of the magazine has been devoted to that subject. Try 'French Principia' and 'Latin Principia,' Murray; or Dr. Abbott's 'Via Latina,' Seeley; or Macmillan's 'Progressive French Course.' Have you seen Hughes's 'French and German Journal'? 3d. a month. French is likely to be most useful to you. We cannot say which are the best. For your purpose try Capel's 'Catch Questions in Arithmetic' together with some book like Colenso's or B. Smith's.

4. PRIVATE STUDENT.—You seem to have enough books. For the first part of your question see Prantl, page 198. For the second see Thomé's 'Botany' (Longman and Co.) page 136. There are appendages to two of the stamens of viola and these are the nectar glands you speak of. Don't trouble about what you think is coming. How can you tell? Do all your work moderately well and you will be sure to find something you can do.

5. ANXIOUS.—Yes, certainly.

6. HIGH SCHOOL.—We don't undertake to value as many as twenty specimens for one person. The best half dozen are No. 9, 8; No. 5, 8; No. 8, 7; No. 3, 7; No. 10, 6; No. 4, 6. Most of them are too small, and for all of them you need to practise good copies so as to learn what the shapes of the letters really are.

7. BACCHUS.—You will find the reason for the Rule for finding Cube Root in *Barnard Smith's* Arithmetic, *Capel's* Catch Questions in Arithmetic and Mensuration, *Todhunter's* Algebra, &c.

8. J.H.—For Euclid try Chambers' 'Euclid,' Casey's 'Euclid,' Todhunter's 'Euclid,' all good; the first and last would suit you best. For mensuration try Todhunter's 'Mensuration for beginners.' You really must be more definite. How can one recommend a book on Geography, or on History. Say exactly what you want to learn and how much you know already. Buy Philip's 'School Atlas,' or Johnstone's.

9. NOEL.—As to translation you need have no hesitation in putting the author's sentences in the best English at your command. There is no such thing as literal translation. What sometimes passes for it is not translation at all. It is often not English, and scarcely ever expresses in English what the author expressed in the language in which he was writing. Be sure your examiner understands both languages. When he asks you to explain a peculiar construction, do so, but do not under the name of a translation give him a list of the possible meanings of isolated words and phrases.

10. WELSHMAN.—The speed of a railway train increases uniformly for the first three minutes after starting, and during this times it travels 1 mile. What speed (in miles per hour) has it now gained, and what space did it describe in the first two minutes? (*Magnus.*)

Let f denote the acceleration in miles per hour, and t the time in hours;

$$\text{Then, space} = \tfrac{1}{2} f t^2;$$
$$\therefore \text{ 1 mile} = \tfrac{1}{2} f \times (\tfrac{1}{20})^2$$
$$= \tfrac{1}{2} f \times \tfrac{1}{400}$$
$$= \tfrac{1}{800} f$$
$$\therefore f = 800 \text{ miles.}$$
$$\text{Velocity per hour} = ft$$
$$= 800 \text{ miles} \times \tfrac{1}{20}$$
$$= \underline{40 \text{ miles.}} \text{ Ans.}$$
$$S = \tfrac{1}{2} f t^2;$$
$$\therefore \text{ Space described in 2 minutes} = [\tfrac{1}{2} \times 800 \times (\tfrac{1}{30})^2] \text{ mile}$$
$$= (400 \times \tfrac{1}{900}) \text{ mile}$$
$$= \underline{\tfrac{4}{9} \text{ mile.}} \text{ Ans.}$$

Note.—Please repeat the other question, and send the answer.

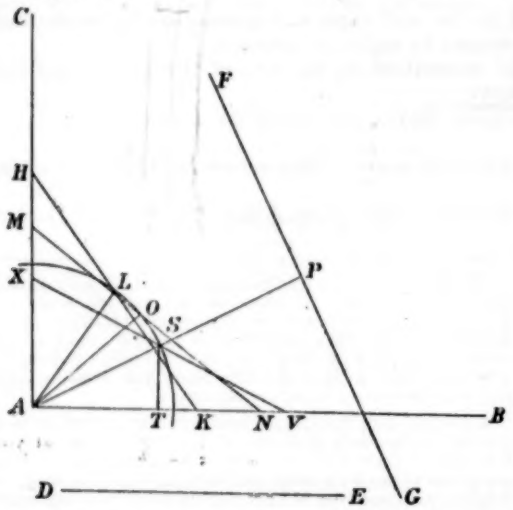
11. A P. T.—Huxley's 'Physiography' and Lawson's 'British Colonies,' Mackenzie's and Justin M'Carthy's 'History.' Todhunter or C. Smith's (larger books). Mansford's 'Mental Arithmetic.' Dunstan's 'Music Manual.' You will find all these books and some others you need on economy and arithmetic particularized in the query column of this magazine for the last year or two. You should read these replies. You would gain information and be saving yourself time and trouble. You may find difficulty in gaining admission for one year; two years is the usual course, but you could apply. Do so at once.

12. SCOTCHIE.—Macaulay's Essay on Lord Clive is not set for grammatical purposes. Read it, understand it, look out the allusions.

13. QUADRATIC.—As the answers given do not satisfy the equation, you have evidently copied it incorrectly. Will you please repeat it?

Geometry.

1. A. P. T.—A line of given length moves between two lines at right angles to each other, having one of its ends on each of them; find when its centre is at a minimum distance from a given line.



Let AB, AC be the straight lines at right angles.

Let DE be the given length, and FG the given line.

From AC cut off any length as AH less than DE.

From centre H and distance DE describe a circle cutting AB in K.

Bisect HK in L, and join AL.

Then because the angle HAK is a right angle, the circle described from centre L with radius LH or LK will pass through L.

Therefore AL = ½ HK or ½ DE.

Similarly if MN or any other line be drawn equal to DE, and bisected in O, then AO = ½ DE.

∴ Locus of middle points of all lines so placed is a circle whose centre is A and radius ½ DE.

Describe the circle, and draw AP at right angles to FG, cutting the circle in S.

Then S is the nearest point of circle to FG.

Draw ST perpendicular to AB.

Make TV = TA; join VS and produce it to meet AB in X.

Then XV is the line equal to DE, whose middle point S is nearest to FG.

For AV is bisected in T, and ST is parallel to AX.

Therefore XV is bisected in S.

And VS = AS = ½ DE.

Wherefore XV = DE.

Q. E. F.

Algebra.

1. B'HAM.—Solve:—

$$x^4 - 2x^3 + x = 380. \quad (\textit{Hall and Knight.})$$

$$x^4 - 2x^3 + x = 380$$
$$x^4 - 2x^3 + x^2 - x^2 + x = 380$$
$$(x^2 - x)^2 - (x^2 - x) = 380$$
$$(x^2 - x)^2 - (x^2 - x) + (\tfrac{1}{2})^2 = 380 + \tfrac{1}{4}$$
$$= 380\tfrac{1}{4}$$
$$(x^2 - x) - \tfrac{1}{2} = \pm \tfrac{39}{2}$$
$$x^2 - x = \pm \tfrac{39}{2} + \tfrac{1}{2}$$
$$= 20, \text{ or } -19$$
$$x^2 - x + (\tfrac{1}{2})^2 = 20 + \tfrac{1}{4}, \text{ or } -19 + \tfrac{1}{4}$$
$$= 20\tfrac{1}{4}, \text{ or } -18\tfrac{3}{4}$$
$$x - \tfrac{1}{2} = \pm \tfrac{9}{2}, \text{ or } \pm \frac{\sqrt{-75}}{2}$$
$$\therefore x = \pm \tfrac{9}{2} + \tfrac{1}{2}, \text{ or } \pm \frac{\sqrt{-75}}{2} + \tfrac{1}{2}$$
$$= 5, -4, \text{ or } \frac{1 \pm \sqrt{-75}}{2}.$$

2. E. N.—Solve:—

$$\frac{1}{x-6} + \frac{2}{x-3} - \frac{1}{x} = \frac{4}{7}.$$

(*Preliminary Examination, Chartered Accountants*, 1883.)

$$\frac{1}{x-6} + \frac{2}{x-3} - \frac{1}{x} = \frac{4}{7}$$
$$\frac{1}{x-6} - \frac{1}{x} = \frac{4}{7} - \frac{2}{x-3}$$
$$\frac{x - x + 6}{x^2 - 6x} = \frac{4x - 12 - 14}{7x - 21}$$
$$\frac{6}{x^2 - 6x} = \frac{4x - 26}{7x - 21}$$
$$3(7x - 21) = (2x - 13)(x^2 - 6x)$$
$$21x - 63 = 2x^3 - 25x^2 + 78x$$
$$2x^3 - 25x^2 + 57x + 63 = 0;$$

Assume $x = z + \frac{25}{6}$]

$$\therefore 2(z + \tfrac{25}{6})^3 - 25(z + \tfrac{25}{6})^2 + 57(z + \tfrac{25}{6}) + 63 = 0$$
$$2(z^3 + \tfrac{25}{2}z^2 + \tfrac{625}{18}z + \tfrac{15625}{216}) - 25(z^2 + \tfrac{25}{3}z + \tfrac{625}{36}) + 57z + \tfrac{1425}{6} + 63 = 0$$
$$2z^3 + 25z^2 + \tfrac{625}{9}z + \tfrac{15625}{108} - 25z^2 - \tfrac{625}{3}z - \tfrac{15625}{36} + 57z + \tfrac{1425}{6} + 63 = 0$$
$$2z^3 - \tfrac{253}{9}z - \tfrac{13225}{54} = 0$$
$$z^3 - \tfrac{253}{18}z - \tfrac{13225}{108} = 0;$$

In the cubic equation

$$z^3 + qz + r = 0,$$
$$z = \left(-\frac{r}{2} + \sqrt{\frac{r^2}{4} + \frac{q^3}{27}}\right)^{\frac{1}{3}} + \left(-\frac{r}{2} - \sqrt{\frac{r^2}{4} + \frac{q^3}{27}}\right)^{\frac{1}{3}};$$

In the given equation

$$q = -\tfrac{253}{18} \text{ and } r = -\tfrac{13225}{108};$$
$$\therefore z = \left(\tfrac{13225}{216} + \sqrt{\tfrac{149401729}{46656} - \tfrac{80089}{46656}}\right)^{\frac{1}{3}} + \left(\tfrac{13225}{216} - \sqrt{\frac{149401729 - 80089}{46656}}\right)^{\frac{1}{3}}$$
$$= \left(\tfrac{12225}{216} + \sqrt{\tfrac{149321640}{46656}}\right)^{\frac{1}{3}} + \left(\tfrac{12225}{216} - \frac{\sqrt{149321640}}{216}\right)^{\frac{1}{3}}$$
$$= \frac{(12225 + \sqrt{149321640})^{\frac{1}{3}}}{6} + \frac{(12225 - \sqrt{149321640})^{\frac{1}{3}}}{6};$$
$$\therefore x = \tfrac{1}{6}[25 + (12225 + \sqrt{149321640})^{\frac{1}{3}} + (12225 - \sqrt{149321640})^{\frac{1}{3}}].$$

3. ALGEBRA.—A certain number of plums was bought for a shilling. If each plum had been a half-penny dearer, the number of plums in a shilling's worth would have been diminished by two. How many were bought at first?

Let x = Number of plums for a shilling,

Then $\frac{24}{x}$ = Price of each plum in halfpence;

$$\therefore x - 2 = 24 \div \left(\frac{24}{x} + 1\right)$$
$$= 24 \div \frac{24 + x}{x}$$
$$= 24 \times \frac{x}{x + 24}$$
$$(x - 2)(x + 24) = 24x$$
$$x^2 + 22x - 48 = 24x$$
$$x^2 + 22x - 24x = 48$$
$$x^2 - 2x = 48$$
$$x^2 - 2x + 1 = 49$$
$$x - 1 = \pm 7$$
$$\therefore x = \pm 7 + 1$$
$$= 8, \text{ or } -6.$$

$\therefore$ Number of plums bought at first for a shilling = 8. Ans.

4. B'HAM.—Solve :—

$$27x^3 + 21x + 8 = 0. \quad (\textit{Hall and Knight.})$$
$$27x^3 + 21x + 8 = 0$$
$$27x^3 + 1 + 21x + 7 = 0$$
$$27\left(x^3 + \tfrac{1}{27}\right) + 21\left(x + \tfrac{1}{3}\right) = 0$$

Dividing by $(x + \frac{1}{3})$]

$$27\left(x^2 - \frac{x}{3} + \tfrac{1}{9}\right) + 21 = 0$$
$$x^2 - \frac{x}{3} + \tfrac{1}{9} + \tfrac{7}{9} = 0$$
$$x^2 - \frac{x}{3} = -\tfrac{8}{9}$$
$$x^2 - \frac{x}{3} + \left(\tfrac{1}{6}\right)^2 = -\tfrac{8}{9} + \tfrac{1}{36}$$
$$= -\tfrac{31}{36}$$
$$x - \tfrac{1}{6} = \pm \frac{\sqrt{-31}}{6}$$
$$\therefore x = \frac{1 \pm \sqrt{-31}}{6}.$$

As we divided by $(x + \frac{1}{3})$,
We can put $x + \frac{1}{3} = 0$
$$\therefore x = -\tfrac{1}{3}.$$
$$\therefore x = -\tfrac{1}{3}, \text{ or } \frac{1 \pm \sqrt{-31}}{6}.$$

5. BURTON.—Prove—

$$\text{Log}_e(x + 1) = \frac{4x}{2x + 1}\log_e x - \frac{2x - 1}{2x + 1}\log_e(x - 1) - \frac{2}{2x + 1}\left[\frac{1}{2.3.x^3} + \frac{2}{3.5.x^5} + \frac{3}{4.7.x^7} + \ldots\right]$$
(Todhunter.)

We have to prove that

$$\text{Log}_e(x + 1) - \frac{4x}{2x + 1}\log_e x + \frac{2x - 1}{2x + 1}\log_e(x - 1) = -\frac{2}{2x + 1}\left[\frac{1}{2.3.x^3} + \frac{2}{3.5.x^5} + \frac{3}{4.7.x^7} + \ldots\right]$$

$$\text{Log}_e(x + 1) - \frac{4x}{2x + 1}\log_e x + \frac{2x - 1}{2x + 1}\log_e(x - 1)$$
$$= \log_e\left[\left(1 + \frac{1}{x}\right) \times x\right] - \frac{4x}{2x + 1}\log_e x + \frac{2x - 1}{2x + 1}\log_e\left[\left(1 - \frac{1}{x}\right) \times x\right]$$
$$= \log_e\left(1 + \frac{1}{x}\right) + \log_e x - \frac{4x}{2x + 1}\log_e x + \frac{2x - 1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right) + \frac{2x - 1}{2x + 1}\log_e x$$
$$= \log_e\left(1 + \frac{1}{x}\right) + \frac{2x - 1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right) + \left(1 - \frac{4x}{2x + 1} + \frac{2x - 1}{2x + 1}\right)\log_e x$$
$$= \log_e\left(1 + \frac{1}{x}\right) + \frac{2x - 1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right)$$
$$= \log_e\left(1 + \frac{1}{x}\right) + \frac{2x}{2x + 1}\log_e\left(1 - \frac{1}{x}\right) - \frac{1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right)$$
$$= \log_e\left(1 + \frac{1}{x}\right) + \frac{2x}{2x + 1}\log_e\left[\left(1 - \frac{1}{x^2}\right) \div \left(1 + \frac{1}{x}\right)\right] - \frac{1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right)$$
$$= \log_e\left(1 + \frac{1}{x}\right) + \frac{2x}{2x + 1}\log_e\left(1 - \frac{1}{x^2}\right) - \frac{2x}{2x + 1}\log_e\left(1 + \frac{1}{x}\right) - \frac{1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right)$$
$$= \frac{2x}{2x + 1}\log_e\left(1 - \frac{1}{x^2}\right) + \left(1 - \frac{2x}{2x + 1}\right)\log_e\left(1 + \frac{1}{x}\right) - \frac{1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right)$$
$$= \frac{2x}{2x + 1}\log_e\left(1 - \frac{1}{x^2}\right) + \frac{1}{2x + 1}\log_e\left(1 + \frac{1}{x}\right) - \frac{1}{2x + 1}\log_e\left(1 - \frac{1}{x}\right)$$
$$= \frac{2x}{2x + 1}\log_e\left(1 - \frac{1}{x^2}\right) + \frac{1}{2x + 1}\log_e\frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}$$
$$= \frac{2}{2x + 1}\left\{x\log_e\left(1 - \frac{1}{x^2}\right) + \tfrac{1}{2}\log_e\frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}\right\};$$

Now, $\log_e\left(1 + \frac{1}{x}\right) = \frac{1}{x} - \frac{1}{2x^2} + \frac{1}{3x^3} - \frac{1}{4x^4} + \ldots$

$$\log_e\left(1 - \frac{1}{x}\right) = -\frac{1}{x} - \frac{1}{2x^2} - \frac{1}{3x^3} - \frac{1}{4x^4} - \ldots$$

$\therefore \log_e\left(1 + \frac{1}{x}\right) + \log_e\left(1 - \frac{1}{x}\right)$, or $\log_e\left(1 - \frac{1}{x^2}\right) = -\frac{1}{x^2} - \frac{1}{2x^4} - \frac{1}{3x^6} - \frac{1}{4x^8} - \ldots$

And $\log_e\frac{1 + \frac{1}{x}}{1 - \frac{1}{x}} = 2\left(\frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \frac{1}{7x^7} + \ldots\right)$

$$\therefore \frac{2}{2x + 1}\left\{x\log_e\left(1 - \frac{1}{x^2}\right) + \tfrac{1}{2}\log_e\frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}\right\}$$
$$= \frac{2}{2x + 1}\left[x\left(-\frac{1}{x^2} - \frac{1}{2x^4} - \frac{1}{3x^6} - \frac{1}{4x^8} - \ldots\right) + \tfrac{1}{2}\text{ of }2\left(\frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \frac{1}{7x^7} + \ldots\right)\right]$$
$$= \frac{2}{2x + 1}\left[-\frac{1}{x} - \frac{1}{2x^3} - \frac{1}{3x^5} - \frac{1}{4x^7} - \ldots + \frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \frac{1}{7x^7} + \ldots\right]$$
$$= \frac{2}{2x + 1}\left[-\left(\frac{1}{2x^3} - \frac{1}{3x^3}\right) - \left(\frac{1}{3x^5} - \frac{1}{5x^5}\right) - \left(\frac{1}{4x^7} - \frac{1}{7x^7}\right) - \ldots\right]$$
$$= -\frac{2}{2x + 1}\left[\frac{1}{2.3.x^3} + \frac{2}{3.5.x^5} + \frac{3}{4.7.x^7} + \ldots\right]$$

Q. E. D.

6. CAN'K.—If $\phi(n)$ be the sum of n terms of an A. P., find $\phi(n)$ in terms of n and the first two terms.

Also show that

$$\phi(n+3) - 3\phi(n+2) + 3\phi(n+1) - \phi(n) = 0.$$

(Todhunter.)

If a represent the first term, and d the difference,

Then, $\phi(n) = [2a + (n-1)d.] \frac{n}{2}$

Let b denote the second term,

Then, $b = a + d$, and $d = b - a$;

$$\therefore \phi(n) = [2a + (n-1)(b-a)] \frac{n}{2}$$

$$= [2a + n(b-a) - b + a] \frac{n}{2}$$

$$= [n(b-a) + 3a - b] \frac{n}{2}$$

$$= \frac{n^2(b-a)}{2} + \frac{n(3a-b)}{2}.$$

Hence :—

$$\phi(n+3) - 3\phi(n+2) + 3\phi(n+1) - \phi(n)$$

$$= \frac{b-a}{2}[(n+3)^2 - 3(n+2)^2 + 3(n+1)^2 - n^2]$$

$$+ \frac{3a-b}{2}[n+3 - 3(n+2) + 3(n+1) - n]$$

$$= \frac{b-a}{2}[n^2 + 6n + 9 - 3(n^2 + 4n + 4)$$

$$+ 3(n^2 + 2n + 1) - n^2]$$

$$+ \frac{3a-b}{2}[3 - 3n - 6 + 3n + 3]$$

$$= \frac{b-a}{2}[6n + 9 - 3n^2 - 12n - 12 + 3n^2$$

$$+ 6n + 3] + \left(\frac{3a-b}{2} \times 0\right)$$

$$= \frac{b-a}{2} \times 0$$

$$= \underline{0}. \text{ Ans.}$$

7. FRANK.—Sum to n terms

$$\left(r - \frac{1}{r}\right)^2 + \left(r^2 - \frac{1}{r^2}\right)^2 + \left(r^3 - \frac{1}{r^3}\right)^2 + \ldots\ldots$$

(Todhunter.)

$$\left(r - \frac{1}{r}\right)^2 + \left(r^2 - \frac{1}{r^2}\right)^2 + \left(r^3 - \frac{1}{r^3}\right)^2 + \ldots\ldots$$

to n terms

$$= \left(r^2 - 2 + \frac{1}{r^2}\right) + \left(r^4 - 2 + \frac{1}{r^4}\right) + \left(r^6 - 2 + \frac{1}{r^6}\right) + \ldots\ldots$$

to n terms

$$= (r^2 + r^4 + r^6 + \ldots\ldots r^{2n}) + \left(\frac{1}{r^2} + \frac{1}{r^4} + \frac{1}{r^6} + \ldots\ldots + \frac{1}{r^{2n}}\right) - 2n$$

$$= \frac{r^2(r^{2n}-1)}{r^2-1} + \frac{\frac{1}{r^2}\left(\frac{1}{r^{2n}} - 1\right)}{\frac{1}{r^2} - 1} - 2n$$

(Sum of two geometrical progressions)

$$= \frac{r^2(r^{2n}-1)}{r^2-1} + \frac{\frac{1}{r^2}\left(\frac{1-r^{2n}}{r^{2n}}\right)}{\frac{1}{r^2}(1-r^2)} - 2n$$

$$= \frac{r^2(r^{2n}-1)}{r^2-1} + \frac{r^{2n}-1}{r^{2n}(r^2-1)} - 2n$$

$$= \frac{r^{2n}-1}{r^2-1}\left(r^2 + \frac{1}{r^{2n}}\right) - 2n. \text{ Ans.}$$

8. CYCLOPS.—Solve the equation :—

$$\left.\begin{aligned} x^2yz &= a \\ xy^2z &= b \\ xyz^2 &= c \end{aligned}\right\} \textit{(Jones and Cheyne.)}$$

$$\left.\begin{aligned} (1)\ x^2yz &= a \\ (2)\ xy^2z &= b \\ (3)\ xyz^2 &= c \end{aligned}\right\}$$

Multiplying all together] $x^4y^4z^4 = abc$

$$\therefore xyz = \pm \sqrt[4]{abc}.$$

(1) $x^2yz = a$

$$\frac{x^2yz}{xyz} = \frac{a}{\pm\sqrt[4]{abc}}$$

$$\therefore x = \pm \frac{a}{\sqrt[4]{abc}}.$$

(2) $xy^2z = b$

$$\frac{xy^2z}{xyz} = \frac{b}{\pm\sqrt[4]{abc}}$$

$$\therefore y = \pm \frac{b}{\sqrt[4]{abc}}.$$

(3) $xyz^2 = c$

$$\frac{xyz^2}{xyz} = \frac{c}{\pm\sqrt[4]{abc}}$$

$$\therefore z = \pm \frac{c}{\sqrt[4]{abc}}.$$

Arithmetic.

1. NITOR.—A vat contains 900 gallons of methylated spirits to which 9 % too little naphtha has been added; how much naphtha must be added to bring the mixture to the legal standard, which is 10 % of naphtha?

Quantity of naphtha that ought to have been added at first
= 10 % of 900 gals.
= 90 gals.;

Quantity of naphtha that was added = $\frac{100-9}{100}$ of 90 gals.
= $\frac{91}{100}$ of 90 gals.
= $\frac{819}{10}$ gals.;

gals. gals. gals.
$\therefore (100 - 10) : (900 - \frac{819}{10}) :: 10 :$ Total quantity of naphtha.

gals. gals. gals.
90 : $\frac{8181}{10}$ :: 10 : Total quantity.
= $\frac{8181}{90}$ gals.
= $\frac{909}{10}$ gals.

$\therefore$ Quantity of naphtha to be added = $(\frac{909}{10} - \frac{819}{10})$ gals.
= $\frac{90}{10}$ gals.
= 9 gals. Ans.

2. FOLKESTONIAN.—A field is 25 miles round. Three men start travelling round and round it.

A goes 10 miles per hour,
B ,, $33\frac{1}{3}$,, ,, ,
C ,, $13\frac{1}{3}$,, ,, ,

Find least number of hours when they will be together at the starting point.

Time for A to travel round = $\frac{25}{10}$ hrs. = $\frac{5}{2}$ hrs.,

,, B ,, ,, = $\frac{25}{33\frac{1}{3}}$ hrs. = $\frac{75}{100}$ hr.,
= $\frac{3}{4}$ hr.,

,, C ,, ,, = $\frac{25}{13\frac{1}{3}}$ hrs.
= $\frac{15}{8}$ hrs.
= $1\frac{7}{8}$ hrs.;

Times = $(\frac{5}{2}, \frac{3}{4}, 1\frac{7}{8})$ hrs. respectively.

L. C. M. of Numerators = 15
G. C. M. of Denominators = 2

$\therefore$ Time = $\frac{15}{2}$ hrs.
= $7\frac{1}{2}$ hrs. Ans.

3. SEX.—A, B, and C start together to walk round a circular course 280 yards in circumference; their rates of walking are 4, 5, and 6 miles respectively per hour; after what time will they all be together again at the starting point, and how many rounds will each have then made? (*Certificate*, 1882.)

$$\text{Time for A to walk a round} = \frac{\frac{7}{280}}{4 \times 1760} \text{ hr.}$$

$$= \frac{7 \times 60}{176} \text{ min.}$$

$$= \frac{105}{44} \text{ min.},$$

$$\text{,, B ,, ,,} = \frac{\frac{7}{280}}{5 \times 1760} \text{ hr.}$$

$$= \frac{7 \times 60}{5 \times 44} \text{ min.}$$

$$= \frac{84}{44} \text{ min.},$$

$$\text{,, C ,, ,,} = \frac{\frac{7}{280}}{6 \times 1760} \text{ hr.}$$

$$= \frac{7 \times 60}{6 \times 44} \text{ min.}$$

$$= \frac{70}{44} \text{ min.};$$

$$\text{Times} = \frac{105, 84, 70}{44} \text{ min. respectively.}$$

L. C. M. of 105, 84, 70 = 420;

∴ They are all together at the starting point in $\frac{420}{44}$ min.

$$= \frac{105}{11} \text{ min.}$$

$$= 9\frac{6}{11} \text{ min.}$$

No. of rounds made by A = 420 ÷ 105 = 4
,, ,, B = 420 ÷ 84 = 5
,, ,, C = 420 ÷ 70 = 6

4. CECILIA.—A woman sold $7\frac{1}{2}$ dozen oranges for 6s. 2d., some at the rate of 3 for $2\frac{1}{2}$d., and the rest at 8 for $6\frac{1}{2}$d. Required the number sold at each rate. (*Kingston* 'Test Cards.')

$$\text{Average selling price} = \frac{6\text{s. } 2\text{d.}}{7\frac{1}{2} \text{ doz.}}$$

$$= \frac{74}{90}\text{d.}$$

$$= \frac{37}{45}\text{d.};$$

$$\text{Selling price of each of 1st lot} = \frac{2\frac{1}{2}\text{d.}}{3}$$

$$= \frac{5}{6}\text{d.};$$

$$\text{,, ,, ,, 2nd ,,} = \frac{6\frac{1}{2}\text{d.}}{8}$$

$$= \frac{13}{16}\text{d.};$$

Difference between average price and price of 1st lot

$$= \left(\frac{5}{6} - \frac{37}{45}\right)\text{d.}$$

$$= \frac{75 - 74}{90}\text{d.}$$

$$= \frac{1}{90}\text{d.};$$

Difference between average price and price of 2nd lot

$$= \left(\frac{37}{45} - \frac{13}{16}\right)\text{d.}$$

$$= \frac{592 - 585}{720}\text{d.}$$

$$= \frac{7}{720}\text{d.};$$

∴ No. in 1st lot : No. in 2nd lot :: $\frac{7}{720}$: $\frac{1}{90}$
:: 7 : 8;

∴ No. in 1st lot = $\frac{7}{7+8}$ of $7\frac{1}{2}$ dozen

$$= \frac{7}{15} \text{ of } 90$$

$$= 42;$$

,, ,, 2nd ,, = 90 − 42
= 48.

5. LEARNER.—A man owes a debt of £1,430 due 2 years hence; he invests a certain sum in the 3 per cents. at 73, and at the end of the first year he invests a like sum and also the interest on the first sum in the same funds, which have risen to 76. At the end of the second year he sells out at $79\frac{1}{2}$, and with the interest realizes just enough to pay his debt. Find the sum invested. (*Marlbro'* Arithmetic.)

Income first year on an investment of £73 = £3;

Income second year on that and a further investment of £73 and the interest £3, or £76 = £6;

Amount received for these investments on selling out

$$= £79\tfrac{1}{2} \times 2$$

$$= £159;$$

Amount received with interest = £159 + £6
= £165;

∴ £165 : £1430 :: £73 : Sum invested each year.

3 | 165 : 1430 :: 73

3 | 1898

£632 13s. 4d. Ans.

6. ASSISTANT MASTER.—A person bought a French watch, bearing a duty of 25 per cent., and sold it at a loss of 5 per cent.; had he sold it for £3 more he would have cleared 1 per cent. on his bargain. What had the French maker for it?

Suppose the watch cost £100,
Then cost with duty = £125;
Loss = 5 % on £125 = £6 5s.,
Gain = 1 % ,, ,, = £1 5s.,
Difference between the two prices = £6 5s. + £1 5s.
= £7 10s.;

∴ Cost of watch = £100 × $\frac{3}{7\frac{1}{2}}$

= £100 × $\frac{2}{5}$

= £40. Ans.

Trigonometry.

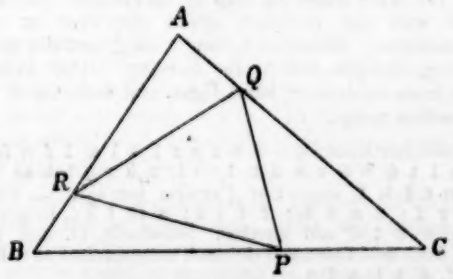
1. THIRD STAGE.—P, Q, R are points in the sides BC, CA, and AB respectively of a triangle, such that

$$\frac{BP}{BC} = \frac{CQ}{CA} = \frac{AR}{AB} = x;$$

show that

$$PQ^2 + QR^2 + RP^2 = (a^2 + b^2 + c^2)(1 - 3x + 3x^2).$$

(*Todhunter's* '*Trigonometry for Beginners.*')



$$\frac{BP}{BC} = \frac{CQ}{CA} = \frac{AR}{AB} = x,$$

$$\frac{BP}{a} = \frac{CQ}{b} = \frac{AR}{c} = x,$$

∴ BP = ax, CQ = bx, AR = cx.

$$PQ^2 = PC^2 + CQ^2 - 2PC.CQ \cos C$$
$$QR^2 = QA^2 + AR^2 - 2QA.AR \cos A$$
$$RP^2 = RB^2 + BP^2 - 2RB.BP \cos B$$

$$\therefore PQ^2 + QR^2 + RP^2$$
$$= (a - ax)^2 + (bx)^2 - 2bx\,(a - ax)\cos C$$
$$+ (b - bx)^2 + (cx)^2 - 2cx\,(b - bx)\cos A$$
$$+ (c - cx)^2 + (ax)^2 - 2ax\,(c - cx)\cos B$$
$$= a^2 - 2a^2x + a^2x^2 + b^2x^2 - 2abx\,(1 - x)\cos C$$
$$+ b^2 - 2b^2x + b^2x^2 + c^2x^2 - 2bcx\,(1 - x)\cos A$$
$$+ c^2 - 2c^2x + c^2x^2 + a^2x^2 - 2acx\,(1 - x)\cos B$$
$$= a^2 + b^2 + c^2 - 2a^2x - 2b^2x - 2c^2x + 2a^2x^2 + 2b^2x^2 + 2c^2x^2$$
$$- 2bcx\,(1 - x)\cos A - 2acx\,(1 - x)\cos B$$
$$- 2abx\,(1 - x)\cos C$$
$$= (a^2 + b^2 + c^2) - 2x\,(a^2 + b^2 + c^2) + 2x^2(a^2 + b^2 + c^2)$$
$$- 2x\,(1 - x)\,[bc\cos A + ac\cos B + ab\cos C]$$
$$= (a^2 + b^2 + c^2)\,(1 - 2x + 2x^2)$$
$$- 2x\,(1 - x\left\{bc \times \frac{b^2 + c^2 - a^2}{2bc} + ac \times \frac{a^2 + c^2 - b^2}{2ac}\right.$$
$$\left. + ab \times \frac{a^2 + b^2 - c^2}{2ab}\right\}$$
$$= (a^2 + b^2 + c^2)\,(1 - 2x + 2x^2)$$
$$- x\,(1 - x)\,[b^2 + c^2 - a^2 + a^2 + c^2 - b^2 + a^2 + b^2 - c^2]$$
$$= (a^2 + b^2 + c^2)\,(1 - 2x + 2x^2) - (x - x^2)\,(a^2 + b^2 + c^2)$$
$$= (a^2 + b^2 + c^2)\,(1 - 3x + 3x^2).$$

How a Scotch School was Examined.

THE first day was devoted to the examination of Infants. Standards I. and II. and the written work—writing and arithmetic of Standards IV., V. and VI.

H. M. Inspector, after examining the school offices, found the children of III., IV., V., and VI. seated in the main room ready for their music lesson. Standard I. in a centre class-room and the Infants in their own room. After overhauling log book he asked for a list of songs. While one chosen by him was being sung the second master was setting an exercise in four pulse measure on the black board in one part; but when he heard the children do a modulator voluntary and a number of ear exercises on the school harmonium he requested a second part to be added. Questions on the number of pulses, &c., were allowed and the treble and alto permitted to try their parts over before singing them together. Standards II. and III. were asked to sing by themselves, and also tried with ear exercises given step-wise on the harmonium. Standard I. sang a song, and did some singing, at sight and by hand signs. The Infants sang from modulator, hand signs, and were asked for two action songs.

Modulator Exercise:—**d m s m r f t l d' l f m fe s d' ta l t d' m d' s m d t_1 l_1 — l_1 t_1 d r m bah se l l s f m r d t_1 l_1** &c. Ear Exercise for IV., V., VI.—**d m r f; s m d t_1; r f l s; s fe l s;** Inspector asked **d' r' t d'** and another. Standards II. and III. sang from modulator and did such ear exercises as **m f s, r m f, d' t l, s f m.**

Every child in the Infant Classes had to read and spell, and answer on meanings of words, animals, &c. Mental Arithmetic was given, and strict attention paid that fingers were not used in either adding or subtracting. A certain number of capital and small letters was taken from all; even those who had but just made their attendances were expected to have mastered the most, if not all, of the small letters.

The Infant Mistress was asked to give a lesson on 'Colour,' 'A lesson in Arithmetic,' and the Inspector asked for one of a list of 12 Object Lessons gone over during the year, the one selected being 'A Railway Station.'

Returning to the senior class-room, Standards IV., V., and VI., were seated in such a manner as to make copying impossible, and, provided with foolscap, ink, and pens, were ready for action. Standard VI. got an essay to write on 'The game I like best,' and V. were asked to give an abstract of the story of 'Napoleon and the English Sailor,' which was narrated by the Inspector.

While the higher Standards were doing their written work Standards I. and II. were examined in reading, writing and arithmetic. The boys read from the one set and the girls from the other. In Standard II. questions were asked on the subject matter to test the intelligence; and verbs, nouns, adjectives were to be found.

Writing:—Standard I. wrote a line from their books, every alternate pupil taking a different line from his neighbour. Standard II.—'A famous doctor came to the court of an eastern prince. On his arrival, he asked, "How do you manage to live here?" "We do not eat" was the reply.'

Arithmetic for Standard I. read in words—

1. 648 + 701 + 34 + 890 + 215. 2,488. Ans.
2. 846 + 642 + 986 + 475 + 348. 3,297. Ans.
3. 831 − 609. 222. Ans.

STANDARD II.

The children were placed back-to-back on the floor and all got the same sums.

1. 7,165 + 9,760 + 4,584 + 6,872 + 4,815 + 9,186 + 783. 43,165. Ans.
2. 70,963 − 9,184. 61,779. Ans.
3. 785,402 × 6. 4,712,412. Ans.

STANDARD III.

'A simple way to catch eels is by using a corn-sack in the following manner. Turn down a hem, and run a line round the mouth; drop a sheep's paunch into the sack, and fill up the vacant space with straw, packing it as tight as possible; then sink your sack in the pond or river.'

STANDARD IV.

'So the news was spread over the whole island that the Rajah must go to meet the great spirit on the top of the mountain; and every village sent forth its men, and they cleared away the jungle and made bridges over the mountain streams and smoothed the rough places for the Rajah's passage. And when they came to the steep and craggy rocks of the mountain, they sought out the best paths, sometimes along the bed of a torrent.'

The following are specimens of the Arithmetic cards distributed. The sums were to be worked and put on paper within the hour.

STANDARD III.

1. Multiply sixty thousand five hundred and forty one by four hundred and eighty two.

29,180,762. Ans.

2. Divide eight hundred and four thousand and sixty nine by sixty three (factors).

12,763. Ans.

3. 1,459,803 ÷ 376. 3,882 $\frac{171}{376}$. Ans.

4. From £250 0s. 5d. take £39 10s. 10½d.

£210 9s. 6½d. Ans.

STANDARD IV.

1. £890 17s. 1¾d. × 273.

£243,204 0s. 9¾d. Ans.

2. Reduce 97,305 stones to tons.

608 tons 3 cwt. 1 stone. Ans.

3. Reduce fifteen thousand and nine half crowns to half-pence.

900,540 half-pence. Ans.

4. How many minutes in 6 weeks 3 hours?

60,660 min. Ans.

STANDARD V.

1. Find by practice the cost of 4,711 articles at £2 13s. 8¼d. each.

£12,646 1s. 9¾d. Ans.

2. Make out the following bill:—

1 box of cod, 176 lbs., at 2½d. per lb.
4 salmon, each 48½ lbs., at 10½d. per lb.
5 boxes of whelks, weighing altogether 4½ cwt., at ½d. per lb.
9 lobsters at 4s. 3d. each.

£1 16s. 8d. + £8 9s. 9d. + £1 1s. + £1 18s. 3d. = £13 5s. 8d. Ans.

3. From the sum of $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{8}$, take $\frac{1}{3}$ of $\frac{3}{4}$.

$\frac{7}{24}$. Ans.

4. What is the rent of 150 ac. 15 pls. when 6 ac. 3 rds. 18 pls. are let for £42 19s. 6d.?

£939 18s. 7$\frac{23}{121}$d. Ans.

STANDARD VI.

1. Find the value of $\frac{3}{15}$ of 6s. 6d. + $\frac{11}{19}$ of £1 18s. − 5$\frac{4}{11}$ of 2s. 9d.

8s. 9d. Ans.

2. What sum of money will produce 13s. 6d. as interest in 5 months at 4½ per cent.?

£36. Ans.

3. In a school the fees amount to £3 14s. 8d. in a week; 100 scholars pay 3d. and the rest 2d. How many scholars were there?

198. Ans.

4. If 72 men build a wall 140 yds. long and 6 ft. high in 14 days, in how many days will 112 men build a wall 80 yds. long and 7 ft. high?

6 days. Ans.

In Standards III.—VI. every child read. If they managed to speak in an easy, natural manner, they passed at once. Any child hesitating in attacking a passage was asked to try his strength in another part of the book. After the reading was over, the pupils were tested as to intelligence and general knowledge. Parsing and analysis were taken from the reading book and not confined to the bare requirements given in code. Sentence-making was exacted from IV., V., and VI.

STANDARD III.

Repetition.—Wordsworth's 'Pet Lamb.' Irregular testing of individual children, one verse each, and also children required to finish a verse after the naming of one or two words at the beginning. Careful meaning of phrases and single words.

STANDARD IV.

Thomson's 'Seasons,' beginning at 'Now, when the first foul torrent of the brooks. Meaning as in Standard III. with sentence-making.

STANDARD V.

'Saxon and Gael.'—Particular attention to suiting the action to the word. Meaning and sentence-making.

STANDARD VI.

Trial scene from 'The Merchant of Venice.' Several children selected to act the parts. Teacher asked to put some questions.

In Geography and History, Standard III. read from a Historical Reader and answered questions on the physical features of Scotland and gave instances of mountains, capes, rivers, &c., defining the meaning of these terms in words. One pupil teacher was asked to give an oral lesson on the life of Bruce, and another examined the Standard on the rivers of Scotland.

STANDARD IV.

Had to tell very minutely the Geography of the south and west coasts of England and also that of Ireland, the whole requiring a familiar acquaintance with the map. The teacher of the class then examined it on the history of Charles II. and the Inspector continued the examination himself till the end of Queen Anne's reign, omitting no important item.

STANDARD V.

Meanwhile had been drawing their favourite map, and were thoroughly tested first on the Geography of the Baltic, the Atlantic, and the Mediterranean, and then on Canada and New Zealand. The whole of their History passed under review.

STANDARD VI.

Drew a map of India and were asked the physical features of America, Asia, and Africa, the occupations and productions of Canada, interchange of products, and causes influencing climate. In History, the wars and constitutional changes in the present reign were the chief items of examination.

NOTE.—For the guidance of Teachers in Scotch Schools.—Recent Inspection Sums will appear in future issues, when practicable, along with other matter that may be useful in preparing for examination.

SEWING EXAMINATION.

INFANTS.

(1) Needle drill. (2) Thimble drill. (3) Knitting pin drill.

A. Hemming.

B. Knitting (6 rows).

STANDARD I.

A. Hemming (about 5 inches).
B. Seaming and felling (about 5 inches).
C. Knitting (6 rows showing chain edge).

STANDARD II.

A. Seaming and felling (showing a join).
B. Knitting (purl and plain, 12 rows).

STANDARD III.

A. Stitching (about 2½ inches) and sewing on a tape.
B. Darning on canvas (8 rows) and herring-boning (about 3 inches).

STANDARD IV.

A. Gathering, stroking, and setting in (band 5 in.).
B. Darn a hole and mark letters E and H.
C. Work a button-hole and sew on button.
D. Flannel patch.

STANDARD V.

A. Tucking.
B. Cut out and tack together a girl's pinafore.

—o—

Model Essays for Pupil Teachers.

BY C. J. DAWSON, B.A.,
Ex-President of the N.U.E.T.

V.

AMONG the subjects for essays which form suitable exercises in composition for students such as these papers are intended to assist, none are likely to afford more useful practice than biographical sketches of eminent men. One advantage connected with such exercises is that the matter to be dealt with consists of facts with which the ordinary reading of a student must make him to some extent acquainted. Another is, that the process of producing a written composition helps to strengthen one's hold upon the knowledge one has already obtained, by the necessity for giving it definite shape. A third is, that in biographical notices the writer is obliged to direct his thoughts carefully to those incidents and qualities which distinguish the life and character of the subject of his sketch, and in this way the power is cultivated of forming and expressing opinions not only on the particular person written about, but on others with whom he may be naturally compared or contrasted.

One further reason for practising the writing of biographical essays which the candidate for examination must deem important is that the life of some person famous in history, literature, or science, is often appointed as the test in composition.

In writing a sketch of a person's life the student may very properly begin with a short statement indicating the special work or position which makes his subject an important person. He may then give a detailed narrative of the events of the life. And, lastly, he may sum up the results of the work accomplished by the person of whom he writes, with opinions on his character and influence, and a statement of the lessons which his life is calculated to teach.

It is needless to add a long list of biographical subjects; but Milton, Shakespeare, George Stephenson, Captain Cook, Wellington and Nelson are examples which often occur in examination papers, and are such as most students might fairly be expected to deal with.

The name we choose for the subject of our specimen essay is one we think peculiarly entitled to the attention of teachers, and specially suitable for the pages of an educational journal. It is the name of a man whose influence on modern literature and on English education is not likely soon to pass away—

MATTHEW ARNOLD.

As poet, critic, and philosopher, Mr. Matthew Arnold has for nearly forty years occupied a high place in the literary world; as educational reformer and school inspector he has for almost the same period held a unique position with regard to the question of national education.

Matthew Arnold was born in December, 1822, at Laleham, a quiet little Thames-side village, where his father, Thomas Arnold, was rector. His father had been educated at Winchester and Oxford, and became later, as Head Master of Rugby School, one of the greatest of schoolmasters, and famous for his wide-spreading moral influence.

After a course of private tuition Matthew Arnold was sent to Winchester school. For a time it is said he was rather unpopular among his school-fellows, because he had been heard to speak to a tutor of the slightness of the tasks required. This unpopularity, however, did not last long, when his companions came to know more of him, and when, within a year of his entering the school, he carried off the first prize for rhetoric, all were proud of him.

In 1837 he was taken from Winchester to be taught at Rugby. Here he worked steadily and successfully till 1841 when, having won the open scholarship at Balliol, he entered that college. During his career at Oxford he won the Hertford Scholarship for proficiency in Latin, and the Newdigate prize for a poem on 'Cromwell'; but he was disappointed at passing the final examinations in the second class. He was elected fellow of Oriel in 1845, a distinction his father had gained just thirty years before.

In 1847 he became private secretary to Lord Lansdowne, and in the next year he published his first volume of poetry,—'The Strayed Reveller and other Poems by A.' In 1851 he was appointed one of Her Majesty's Inspectors of Schools. This post he obtained, as he told a body of teachers in November, 1886, in order that he might be able to marry. His wife was a daughter of Mr. Justice Wightman.

He published 'Empedocles on Etna and other Poems' in 1853, still anonymously; but in the next year he published two series of poems with his name appended. The favourable impression these produced led to his election in 1857 to the Professorship of Poetry at Oxford, a position he continued to hold for ten years. During that time he delivered lectures on 'Translating Homer,' and on the influence of 'Celtic Literature,' and published 'Merope,' a tragedy fashioned on the model of the Greek Drama.

He became more famous, however, for his critical contributions to the periodical press, which from time to time, as they accumulated, have been re-published in volumes—'Essays in Criticism,' 'Culture and Anarchy,' 'St. Paul and Protestantism,' and several others.

In connection with the Duke of Newcastle's Commission on Education, Mr. Arnold was employed to visit and report on the primary schools on the Continent, and in 1861 he published a most valuable report on Education in France, Germany, and Holland. In 1865 he made a second tour to report on schools provided for the upper and middle classes, and the result was published in 1867. His last work of this special kind was to visit and report on certain features of continental education in 1885. This report is especially valuable at the present critical time in our educational system, and on that account has been issued as a very cheap pamphlet.

In recent years Mr. Arnold has entered much into theological and political controversy, though in the latter he has kept himself almost free from mere party views.

In the year 1884 Mr. Arnold went on a lecturing tour in America, and his discourses there were published in England the next year. A paper containing his impressions in America appeared in April last.

Besides the literary work already mentioned, Mr. Arnold edited selections from the poems of Byron and Wordsworth for the 'Golden Treasury' series, and a selection from Johnson's 'Lives of the Poets.'

The sudden death of Matthew Arnold on Sunday, April 15th, came as a shock upon his many friends and admirers in all parts of the civilised world. He had gone to Liverpool the previous Friday to meet his daughter, who was returning from America. Anticipating the meeting with her, he was in the most buoyant spirits. On Sunday morning he had attended service with his wife and friends, and during a walk in the afternoon he suddenly fell forwards, and died immediately from an affection of the heart. His loss to the world of letters, and to the cause of education can hardly be estimated; but his works remain, and through them and through the pleasant memory of the charm which his presence ever brought with it, his influence will still be felt, and will we trust continue to be potent for good. One thought of consolation that forces itself upon us is that he lived out a full life to the very end, and was thus spared all those pangs of slow decay which he has so beautifully, yet so sadly, depicted in his poem on 'Growing Old.'

'It is to spend long days
And not once feel that we were ever young.'
'It is to suffer this,
And feel but half, and feebly, what we feel.'
'It is—last stage of all—
When we are frozen up within, and quite
The phantom of ourselves,
To hear the world applaud the hollow ghost
That blamed the living man.'

Matthew Arnold was spared all this; and more than this, he died full of honour, full of influence, and with all that is best in the world's favour wrapping him round.

His poems are remarkable for the careful finish and clearness by which they are distinguished. There is also noticeable in most of them a tone of sadness. He has been called 'the finest elegiac poet of this century'; and this, when we remember that Shelley's 'Adonais' and Tennyson's 'In Memoriam'—certainly in some sort an elegiac poem—are brought into the comparison, is very high praise. Of his elegiac poems 'The Scholar Gipsy,' and 'Thyrsis,' a monody on his college friend Arthur Hugh Clough, who died at Florence in 1861, are most noteworthy. They are especially beautiful in the numerous passages of pastoral description. 'Rugby Chapel' is another favourite poem of this class. Among his other poems the best known are 'Sohrab and Rustum,' 'The Forsaken Merman,' 'The Strayed Reveller,' 'Empedocles on Etna.'

The prose writing of Matthew Arnold is also marked by those qualities of lucidity and moderation in statement which he so constantly held up as the wants of our time. A striking characteristic of his style is the use of a polished but playful irony. The irony was not the less effective because of its playfulness and good humour, while the shafts of his satire were the keener because of their polish. In many of his works too we have to notice the recurrence of certain phrases coined or adapted by the writer to indicate matters which he wished to emphasise either by way of praise or blame. 'The Philistines' represent the vulgar, the commonplace, the narrow, the insular, the provincial. 'Sweetness and light,' 'sweet reasonableness,' 'the stream of tendency,' are examples of those expressions which he has embalmed in our language by his skilful and persistent use of them.

Of his polemical writings in theology and politics this is not the place to treat, and therefore no more need be said than that his views and his mode of presenting them have commanded careful attention.

To teachers the influence of Mr. Arnold as a worker and writer in the cause of popular education is what marks him out for the highest distinction, and claims from them the heartiest meed of praise. In the address in which he took leave of the teachers in his district, he said, 'Though I am a schoolmaster's son I confess that school teaching or school inspecting is not the line of life I should naturally have chosen.' In spite of this, for thirty-five years he discharged duties, some of which he must have found specially irksome, in such a manner as to win the respect, the esteem, the affectionate regard of all with whom those duties brought him in contact. Why was this? Because he had got such a firm grasp of that best of all principles of criticism—put yourself in the place of those whom you would judge. This made him 'fair and sympathetic' as an inspector, as it made him clear and powerful as a literary critic. His breadth of view combined with his wide range of knowledge gained in his foreign educational tours, tended to eliminate fads and crotchets which, being allowed free development, spoil so many inspectors.

With regard to our educational system it is well known that it had not the approval of Mr. Arnold. He wished to see it broadened and simplified, made freer and better adapted to popular needs, as is plainly shown in his preface to the cheap edition of his last report on education abroad. But what he regarded with even more concern than the unsatisfactory nature of our primary instruction, which is at least organised, was the utter want of organization in our secondary education. He was always lamenting,

even to weariness, the lack of what he spoke of as 'the one thing needful' in our social system,—'Unum porro est necessarium'—the organization on a sound basis of the education of our middle class. This need remains still unsupplied; but we know, from his own hand, that he trusted that the work which he had so much at heart, and for which he had laboured so earnestly, would be ultimately accomplished by the energy and persistence of younger men. May his life-long wish be speedily fulfilled!

(To be continued.)

Publications Reviewed.

The Royal Standard Readers. London: T. Nelson and Sons.

Standard I. The Six Birthdays.

Standard II. Stories and Pictures of Animals.

Standard III. The Corner Cupboard, or Stories of Common things.

Standard IV. Young Folks' Natural History.

Standard V. The Rocket.

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This new set of readers is marked by the attractive qualities which have made Messrs. Nelsons' works so popular in our schools, and is sure of a favourable reception.

The Oriel Geographical Readers. Standards V. VI. VII. London: Marcus Ward and Co. Limited.

These three volumes complete the series edited by Mr. A. Traill. They are distinguished by exceedingly clear typography, the proper names being brought out in bold Clarendon type. Coloured maps are effectively introduced into the text, and each book is well illustrated. The style in which the lessons are written is full of interest; for the writers in their description of countries and cities have seized upon those salient features which, by their remarkable character, are likely to attract attention and appeal to the faculty of wonder. They seem fully aware that this faculty may be made extremely useful in fixing geographical and other facts on the minds of children. Modern books of travel have been largely drawn upon, and this also helps to make the lessons more impressive, by giving an air of reality and truthfulness to the descriptions.

Several of the lessons in the seventh Standard book are based on the Cruise of the 'Challenger,' and some on other exploring expeditions in the Arctic Regions. In this book we have also a few colour-printed illustrations in the well-known style of Oriel House. A small number of appropriate poetical extracts are introduced to illustrate the subjects treated in some of the lessons. A summary of the principal facts for memory work concludes each book.

Arithmetic. By Charles Pendlebury, M.A., F.R.A.S.

Examples in Arithmetic. By Charles Pendlebury, M.A., F.R.A.S. London: G. Bell and Son.

This Arithmetic, which was very fully noticed in the February number of THE PRACTICAL TEACHER for 1887, has met with considerable success, for it has already reached a second edition. This edition does not materially differ from the first edition, the alterations principally consisting in the omission of matter of little consequence, and in the amplification of the explanations in the sections dealing with greatest common measure, decimalization of money, proportion, interest and cube root. No alterations have been made which will prevent the use of the second edition along with its predecessor. The book contains a splendid collection of arithmetical examples, almost unrivalled for variety and number, and the correctness of the answers may be relied upon.

The examples are also published without the answers in a separate book.

French Series:—Scribe's 'Le Verre d'Eau' (A. Barrère). **Piron's 'La Métromanie'** (Leon Delbos). **Galland's 'Ali Baba'** (A. Clare). London: Whittaker and Co.

That most productive playwright, *Scribe* himself, tells us that 'Le Verre d'Eau' is suitable for young people. Bristling as it does with idiomatic expressions, to enable

students to read it with pleasure and profit, much help in the elucidation of the text is a prime necessity. The help here supplied in the notes is excellent, so far as it goes, but we could have wished the annotator had not been quite so chary of his notes.

Piron's '*La Métromanie*,' though incapable of moving our deepest feelings, is yet a very amusing play, and, being written in the purest French, is well suited to take its place among the volumes of this excellent French series. If the editor had not repeated the French text in his notes he would have been able to find room for additional notes. Yet the notes we have are to the point, and will help many readers over a difficult style.

Mr. Clare hopes that the story of *Ali Baba* will prove of great utility as a French Reader to students who already possess some knowledge of the language. In addition to the useful foot-notes there is a very necessary appendage to all works on languages intended for schools, viz., a vocabulary, which is wanting in the other two works.

Whittaker's Modern German Authors. London: Whittaker and Co.

These German Epic Tales, *die Niebelungen* (Aus 'Geschichte der Deutschen National-litteratur' von A. F. C. Vilmar) and *Walter und Hildegund* (Aus 'Deutsche Heldensagen' von Albert Richter) have been most ably annotated by C. Neuhaus, Ph.D. The Introduction and Notes which are very full and exhaustive—and properly so—take up a large proportion of the book. A most interesting specimen of the original text of the Niebelungen-song—the first 'Adventure,' with a literal translation on the opposite page, is given immediately after the Introduction. Advanced students, no doubt, will welcome and appreciate these two interesting specimens of German literature.

Benedix's Doktor Wespe. Edited by Professor F. Lange.

'Benedix' (says Dr. Lange) 'was essentially the clever child of his time, who delighted in a *common-place, middle-class conversation*,' and it is exactly for this reason that the works of Benedix afford such capital practice in idiomatic colloquial German. The excellence of Dr. Lange's editorial work is too well known to need any commendation at our hands. The usefulness of the book is further enhanced by a complete vocabulary.

Zopf und Schwert. Edited with Literary Introduction and Notes by Franz Lange, Ph.D. Whittaker and Co.

This historical comedy of the gifted but ill-fated Gutzkow, one of the most distinguished poets and novelists of modern German literature, in which the Court of Berlin of King Friedrich Wilhelm of Prussia is depicted with such humour and historical faithfulness, has been as carefully and admirably annotated by Herr Lange as the other excellent editions of German and French authors, published by Messrs. Whittaker, already so favourably noticed in the PRACTICAL TEACHER. The notes, though short, are to the point, and contain a large amount of valuable information on delicate points of German grammar, the derivation of words, and various other matters necessary to the elucidation of the text. Such editions as these cannot fail to promote the study of German and French literature in England.

Intermediate German Course. By Franz Lange, Ph.D. London: Whittaker and Co.

This work consists of two parts. Part I. contains the Elements of German Grammar; Part II. Materials for Translation, Dictation, and Extempore, also Conversation on the Translation and Grammatical Questions, and an English Extract to be rendered into German, with an English-German and German-English Vocabulary at the end. Both Parts are admirably worked out, and few books are better calculated to promote the study of German in England.

The Beginner's Book in French. With humorous pictures by Sophie Doriot. London: Swan, Sonnenschein, Lowry, and Co.

An admirable book for beginners. Miss Doriot very truly says: 'By giving children and other beginners subjects which they like, or which are calculated to excite their curiosity, they will, in order to conquer the point which is luring them, master words and expressions in a time and manner that will put to defiance the best arranged methods.' First, we have a humorous picture, under which there are a few lines of poetry, accompanied by an excellent vocabulary explaining all the words in the poetry, and lastly, questions and answers on the subject of the picture. Children have a remarkable facility for learning poetry, especially if repeated in chorus. The child or beginner who has committed to memory the poetry and vocabularies in this little book will have made a capital start towards acquiring a sound knowledge of the French language.

The French Idiomatical Pass-Key to Usual Conversation. By Charles Stuart-Merritt. London: David Nutt.

This book in its main features is like all the thousand and one books on French conversation, but in addition the editor and a friend not only give us fourteen pages of introduction *de omnibus rebus et quibusdam aliis*, but kindly throw us into the bargain some choice selections from Byron, Pope, Sir Walter Scott, Thomas Moore, and Longfellow. Before we are permitted to learn the French for, 'I have a pain in my stomach,' 'What's the matter with your nose,' &c., &c., we are asked to ponder over these lines from Scott:—

> 'There was a soft and pensive grace,
> A cast of thought upon her face,
> That suited well the forehead high,
> The eyelash dark and downcast eye;
> The mild expression spoke a mind
> In duty firm, composed, resigned.'

The book would be much improved by the omission of the poetry, and by printing the vocabularies in readable type.

A Companion to German Grammar and Composition. By D. Edwardes, M.A. London: David Nutt.

The plan of this work is excellent, but the execution is not satisfactory. Herz, das, the heart,—ens, en. What is a beginner to understand by —ens and en? N., Ac. Herz (n. heart), G. Herz—ens, D. Herz—en; Plur., all cases, Herz—en, would be much clearer, and would fill up the vacant space in Herz. *Help*, I cannot help it, *ich kann es nicht ändern*, might with advantage be omitted, and German examples quoted to the numerous important rules where a good example would have fixed the rule in the student's memory. This we consider a very serious mistake in an otherwise very useful book. In German, as in Greek, the particles doch, ja, wohl, &c., offer great, but not insuperable, difficulties for a foreigner. We find them very inadequately treated in the 'Companion,' and yet a good knowledge of them is quite indispensable to the understanding of the most ordinary German sentence, as well as for translating English into German: *ex. gr.*, Bringen sie mir das Buch = bring me the book; but Bringen sie mir *doch* das Buch = *pray* (or *if you please*) bring me the book. *Doch* softens an imperative. Again, es ist sonderbar = it is a strange thing; but, es ist *doch* sonderbar = it is *in my opinion* a strange thing. Here again *doch* softens an assertion = *I should think*. *Ja* has a greater force than *doch*. Fürchten sie es *doch* nicht = *pray* do not fear it; but, Fürchten sie es *ja* nicht = *I conjure you* not to be afraid. Sie sprechen nicht = you do not speak; but, sie sprechen *ja* nicht = *I am surprised* you do

not speak. Das ist ein Brief von meinem Bruder = that is a letter from my brother; but, Das ist *ja* ein Brief von meinem Bruder = *why* (astonishment)! that is a letter, &c. With the modifications we have ventured to suggest we feel sure the 'Companion to German Grammar and Composition' will prove a very useful book.

Ralf's Rapid Road to Spanish. London: George Philip and Son.

This is far and away the best book for the rapid and pleasant acquisition of Spanish we have yet met with. There is not one dull page from beginning to end. The book is divided into two parts—Reading Lessons, &c., and Grammar—thus practice and theory go hand in hand. Each lesson consists of nine parts: (*a*) a Spanish extract with an interlinear pronunciation; (*b*) *free* translation of the extract; (*c*) a *literal* juxtalinear translation; (*d*) the pupil is then directed to turn to his grammar and learn certain portions necessary for the next step; (*e*) an analysis of (*a*) in the form of short sentences; (*f*) *tema*—English sentences (still taken from (*a*)) to be rendered into Spanish; (*g*) Spanish conversation *à la Otto*; (*h*) Spanish juxtalinear commercial correspondence; (*i*) each of the above parts accompanied by an excellent grammatical commentary. We venture to assert that no better system can be devised for the rapid and pleasant acquisition of a language. All the difficulties and peculiarities in the Spanish extract must be mastered in writing the exercises taken from it, and thus become, as it were, pegged down in the memory, thus following Professor Blackie's admirable system of learning a language. There are, however, several serious omissions and many cases of oversight which are most detrimental to the usefulness of the book. These we hope to see remedied in a future edition. *No rules are given for the accentuation of Spanish words.* How are *cc* pronounced? The accent on the verbs should be more carefully marked. Tuviére is marked tuvíere, &c. For beginners all inflections should be separated from the stem, thus: tuv-íste. The free translation might be advantageously omitted by simply inserting it in brackets where the literal translation does not correspond with the English idiom. No object is gained by repeating the text, p. 92. The space thus gained should be utilized for the insertion of reading lessons of quite a different style from those already given. All the endings at least of the irregular verbs should be printed in full. The Ejercicio preparatorio might be profitably extended. In the introduction the author says: 'It will perhaps surprise many to find that some *ten thousand words in Spanish can be readily learned in a single evening* by the adoption of the existing analogies.' See pp. 12 and 13. This book is nicely printed, and to all who wish to learn Spanish in a short time we can most cordially recommend it.

Merry Christmas; a Cantata for Schools and Families. By W. H. Doane. London: J. Curwen and Sons.

Written in Mr. Doane's usual style, bright, cheerful, and melodious, without any great tax upon the singers, this little cantata contains several attractive numbers, likely to prove favourites with the little ones.

Nelly's Dolly; and the Crafty Old Spider. Two Songs for Children. By A. Watson. London: J. Curwen and Sons.

We have much pleasure in calling attention to these publications. They are printed on good paper from bold and clear type, the voice parts being in both notations, with pianoforte accompaniment in staff notation only; and being full music size, and published at a shilling each, we hope the efforts of Messrs. Curwen, in attempting to produce sheet music at this low figure, will meet with the success they deserve.

The two songs before us are simple in style and interesting.

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